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G. STANLEY HALL
President of Clark University and Professor of Psychology and Education

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THE
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FEEBLE-MINDEDNESS AND HEREDITY

By PING LING, Clark University

1. THE NATURE AND THE CLASSIFICATION OF FEEBLE-MINDEDNESS

Feeble-mindedness may be defined as a phenomenon of imperfect and arrested mental development. When we say a person is feeble-minded, we mean that his mental power has failed to reach its normal development; he lacks something in his mental make-up; and he can not learn even though he is placed in a very favorable environment. He may not have any physical stigmata of degeneration. Indeed, his body may be just as strong and healthy as any normal person, but his mind is essentially that of a child. Common school has no place for him, because he can not profit by its instruction. He may be made to earn his own living by manual labor under very favorable circumstances, but he can not be made to compete with the normal individuals on equal terms, or to manage himself or his own affairs with ordinary prudence. He lacks the power of self-control and the intuitive sense of morality. He is not immoral but non-moral. His animal instinct can always have a free play whenever there is a chance. He can not distinguish between what is right and wrong and is incapable of weighing the consequences of his action. In other words, his mental power stops at a given stage of its development and no educational agencies can help him to develop it any further. Physically he is a man, but mentally he is a child.

It should be understood that there is a great distinction between feeble-mindedness and insanity, although the outward manifestations in both cases sometimes appear to be similar to the untrained observer. Insanity is a clinical manifestation of intellectual and emotional disorders, the victim of which not only stops where he is in his mental development, but has lost a part of what he once had. Feeble-mindedness is a state of permanent impairment of the intellectual faculties which have not attained and can never be expected to attain a higher stage of development. As Dr. Esquiral has ably pointed out; " An insane man is deprived of advantages which he formerly enjoyed. He is a rich man, who has become poor. The idiot, on the contrary, has always been in a state of want and misery." Furthermore, insanity is a mental disease and can be cured through proper medical treatment and care, if it is not of progressive dementia type. Feeble-mindedness is incurable, because medical science can not add to the mental treasury anything which it does not possess. Dr. Barr and others think that there are some cases where feeble-mindedness may be accompanied by insanity, like dementia praecox, but there is not sufficient evidence to show that there is a causal relationship between them. They may be concomitant to each other, but they are different in kind and origin, and should not be treated alike.

I should also like to call your attention to the fact that the term " feeble-mindedness " has been used both in a specific and in a generic sense. Specifically it is used to designate the milder form of mental defect. In England the whole group of mental defects is called mental deficiency, or amentia. The various degrees of amentia are called idiots, imbeciles, and the feeble-minded. In America we use feeble-mindedness in its generic sense, and we call the different degrees of feeble-mindedness, idiots, imbeciles, and morons. Moron is derived from a Greek word meaning " a fool "—a person who lacks judgment and good sense. It designates exactly what is meant by " feeble-minded " in England.

In identifying and grading feeble-mindedness we have two different criteria for the basis of our classification. One is based on the different degrees of social and industrial inefficiency, and the other on the different mental age which can be roughly obtained by the application of Binet-Simon Intelligence tests.

Dr. Tredgold, an English medical expert for the feeble-minded, has defined amentia as " a state of restricted potentiality for, or arrest of, cerebral development, in consequence of which the person affected is incapable at maturity of so adapting himself to his environment or to the requirements of the community as to maintain existence independently of external support."[1] This definition is essentially a social one. His main contention is that every normal child possesses an amount of potentiality for mental development which is far above that possessed by the mental defective. Given the same kind of environment and the same amount of training, the normal child will be able to learn to adapt himself to the particular society he is in, while the mental defective will be incapable of maintaining himself without outside help. The difference between them does not lie in the kind or amount of training they receive, but in their ability to respond to training. Endowment makes what one is, and the product of the environment varies in accordance with the original nature upon which it operates.

The objections to this kind of definition are two-fold. In the first place, the majority of the high grade mental defectives may be classified as normal according to this definition. We have no definite idea of what constitutes an inability of adaptation, or at least we have no standard of measurement on which we can base our judgment. High-grade mental defectives may sometimes escape our recognition, because they usually have no physical stigmata of degeneration, can read and write to a certain extent, and can do some kind of manual labor under supervision with a fair degree of success. Even though they fail to earn their own living on account of their low grade of mentality, we are rather inclined to attribute their failure to the lack of opportunity and to the injustice of our social and industrial system rather than to their incapability of being taught to do so.

In the second place, social adaptation is a relative term, as Binet has pointed out that a given degree of intelligence which is sufficient for the French peasant out in the country may not be sufficient for a Frenchman in Paris. It is quite obvious that the more complex society one is in, the higher degree of intelligence is required for him to adapt himself to his environment. The same kind of intelligence which enabled one to have a successful career in the primitive and simple community may not be enough to function properly in the complicated society of today. If Tredgold emphasizes the word "incapable" in his definition, he has failed to provide us a standard or norm by which the inability of social adaptation can be measured and compared. How can we be sure that different investigators use the word "incapable," in describing the social inefficiency of the mental defectives in different places or in different countries, with just the same meaning? We can, indeed, be sure that they do not.

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[1] A. F. Tredgold—Mental Deficiency. p. 8.

In connection with the discussion of Tredgold's definition I may also mention the definitions of the three grades of mental deficiency adopted by the Mental Deficiency Act of 1913 in England. They are as follows.

The feeble-minded are "persons in whose case there exist from birth or from an early age mental defectiveness not amounting to imbecility, yet so pronounced that they require care, supervision, and control for their own protection or for the protection of others, or, in the case of children, that they, by reason of such defectiveness, appear to be permanently incapable of receiving proper benefit from instruction in ordinary schools."

Imbeciles are "persons in whose case there exists from birth or from an early age mental defectiveness not amounting to idiocy, yet so pronounced that they are incapable of managing themselves or their affairs, or, in the case of children, of being taught to do so."

Idiots are "persons so deeply defective in mind from birth, or from an early age, as to be unable to guard themselves against common physical dangers."

Since these definitions are based on social criteria, they are subject to the same objections as I have mentioned above. But there is one thing more which I must mention, that is, I fail to see the difference between the feeble-minded and the imbeciles according to these definitions. Tredgold defined an imbecile as "one who, by reason of mental defect existing from birth, or from an early age, is incapable of earning his own living, but is capable of guarding himself against common physical dangers." This is a comparatively better definition than that adopted by the English Parliament, if we want the distinction between an imbecile and a feeble-minded to be sufficiently clear.

Enough has been said about the social definitions of the mental defectives. Now let us turn our attention to the psychological definitions as adopted by the American psychologists. Since the publication of the Binet-Simon Measuring Scale of Intelligence, the American Association for the Study of the Feeble-Minded has adopted a new method of identifying and grading the phenomena of mental deficiency. The terms idiots, imbeciles, and morons, are used in a very specific and well-defined sense. "Idiots" is used to designate those of mental age up to and including two years; "imbeciles," those of mental age from three to seven years; "morons," those of mental age from seven to twelve years.

It seems to me that the value of these definitions is quite obvious in spite of the limitations of the Binet Intelligence Scale. In the first place, they offer us a quantitative knowledge of the different degrees of feeble-mindedness. We have some standard to go by. We no longer depend upon our personal judgment for our classification. In the second place, they extend our conception of feeble-mindedness to include milder degrees of defect than have generally been associated with this term. Before the development of psychological tests, the high-grade defectives had often been over-looked. Those whose mental development comes only to the level of intelligence between ten and twelve years were often considered as normal by the earlier method of diagnosis. Dr. Terman says: "It is safe to predict that in the near future, intelligence tests will bring tens of thousands of these high-grade defectives under the surveillance and protection of society. This will ultimately result in curtailing the reproduction of feeble-mindedness and in the elimination of an enormous amount of crime, pauperism, and industrial inefficiency. It is hardly necessary to emphasize that the high-grade cases, of the type now so frequently over-looked, are precisely the ones whose guardianship it is most important for the State to assume." [2]

The chief objection raised by some workers in this field concerning the application of Binet Intelligence Scale for the study of feeble-mindedness is that the reliability of grading intellectual growth in terms of years is very questionable, because a year's growth is a very different thing at different periods of life. Here I may quote Mr. Cyril Burt's discussion of Binet hypothesis in a paper published in the Eugenics Review. (Vol. V, p. 364)

"Except for rough and popular purpose, any measurement of mental capacity in terms of age is unsatisfactory. Who would measure height and weight in terms of years? The unit fluctuates in its significance all along the scale. When the child is just beginning to walk and talk, when he is 7 or 8, when he is 10 or 11, when he is on the verge of puberty—at these different periods a retardation of a single year means very different things."

This objection is both psychologically and logically sound. There is a great difference between a ten-year-old who is retarded one year and a five-year-old who is retarded by the same amount. The retardation of one year for a ten-year-old is simply an indication of a little backwardness; while for the five-year-old it is a matter of great concern. To meet this objection Dr. Terman has devised a new method for grading the different degrees of mentality. This is the Intelligence Quotient which is the result of dividing the mental age by the chronological age. For instance, a ten-year-old has ten years intelligence, his I. Q. is 100; 9 years, 90; 11 years, 110, and so on. Those whose I. Q. is below 70 are definitely feeble-minded. Those whose I. Q. is between 50 and 70 are classified as morons; between 25 and 50, imbeciles; and below 25, idiots. In other words, this method enables us to state the grades of feeble-mindedness in definite numerical terms.

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[2] Terman, L. M.—Measurement of Intelligence, p. 6-7.

However, this method may be further improved, if we divide the mental age by the physiological age based on physical examination. Since children of the same chronological age differ widely in their physical development with which their intellectual growth is closely connected, our study of the feeble-minded will be much more accurate, if we base our calculation of their mental age upon their actual physiological development.

By way of summary for this section I may say that the psychological definitions of the various degrees of mental defectives are much more practical and scientific than those social definitions used in the Mental Deficiency Act in England, wooden and mechanical though they may seem. By the application of psychological tests, the feeble-minded can be easily recognized and graded as to the mental status to which they properly belong.

2. The Causes of Feeble-mindedness

In dealing with the causes of feeble-mindedness there are two possibilities we should take into consideration,—the influence of environment and the influence of heredity. Numerous investigations have been made in the last decade with regard to the relative importance of these two factors. They differ widely in their method of collecting and interpreting data, and consequently there is a great discrepancy in their results. But it has been generally agreed by all those who have studied this question that the most frequent proximate cause of feeble-mindedness is morbid heredity.

Dr. Tredgold has divided feeble-mindedness into two types, primary amentia and secondary amentia. The former is due to morbid heredity or germinal impairment, as he calls it, and the latter is due to somatic modification caused by external factors after conception has taken place. The factors which he considered as indicative of, or producing, a variation in the germ plasm are (1) neuopathic inheritance, (2) alcoholism, (3) tuberculosis, (4) syphilis, (5) consanguinity, and (6) age of parents. The factors for somatic modification are (1) abnormal conditions of the mother during pregnancy, (2) difficulty at birth, (3) primogeniture, (4) premature birth, (5) traumatic shocks, (6) diseases, (7) convulsion, and (8) bad nutrition. From hundreds of cases he studied in the clinics in England he declared that from 85 to 90 per cent of the mental defectives were due to intrinsic causes or morbid heredity, and the rest were probably due to extrinsic causes which produces somatic modification.

With regard to the influence of the adverse conditions of environment upon mental development, he thinks that only a small percentage of the milder degrees of feeble-mindedness can be explained on this ground. Thus he says; "With regard to the influence of slum life and all its associated conditions in producing amentia, it is necessary to sound a note of warning. It does happen sometimes that the real mental defectives of our large towns hail from the slums, although I do not think such is disproportionately the case. Still, a sufficient number of defective children come from such areas to make the superficial inquirer, content with that which is apparent, jump to the conclusion that the pernicious environment is therefore the cause of their defect. My own inquiries have convinced me that in the great majority of these slum cases there is a pronounced morbid inheritance, and that their environment is not the cause, but the result, of that heredity. The neuropath is one who is at an economic disadvantage in the struggle for existence. He frequently finds it difficult to hold his place, and he is often possessed of careless, improvident, and intemperate propensities, which cause him to fritter away the money he does earn. He is on the downgrade. No wonder, then, that he drifts to the slums."[3]

Dr. H. H. Goddard, Superintendent of the Training School at Vineland, New Jersey, has collected 327 family histories of those who were in his institution. Out of this number 27 have been thrown out of consideration of the causes on account of insufficient data. One hundred sixty-four or 54% of the remaining 300 histories show definitely that there are hereditary traits of mental defectiveness in the family. Thirty-four cases or 11.3% have been grouped under the head of "Probably Hereditary." Thirty-seven cases or 12% have been explained by neuropathic ancestry. Fifty-seven cases, or 19% have been described as accidental cases. There are eight histories, or 2.6% of the total number, whose causes are not known.

Somewhat similar results, showing the great prevalence of hereditary factor, have been found by other investigators.

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[3] Tredgold, A. F., Mental Deficiency, p. 38.

For instance, in England, Prof. Allbutt said; "I regard feeble-mindedness (if not accidental) as always hereditary, or in other words, it is a ratio of variation. I have never met with a case of manufactured feeble-mindedness apart from accidents either at birth or afterwards." Dr. Ashby, speaking of all grades of mental defect found in early life, said: "In at least 75% the children with amentia that I have examined were hereditary and primary." In America, Dr. Barr has studied 4,050 cases of imbecility and found that more than 65 per cent of them had mental defectives in the family or among the near relatives. In Germany, Koch has collected statistics of the mental defectives in Wuertemberg and concluded that heredity could account for at least 60% of the cases. In Switzerland, (Canton of Berne) the census of 1893 showed that heredity of taint was present in 55% of idiots.

3. The Origin and Transmission of Hereditary Feeble-mindedness

That most of the cases of feeble-mindedness are the result of heredity is unquestionable. That germ cells are the vehicles of heredity has also been an established biological fact. But now we may ask: What is the origin of these defective germ cells, and what are the laws of transmission of such defects from parents to offspring? These are the questions of great biological interest and importance, but also are subjects for debate. Great minds have been engaged in the last decade for solving these problems, but none has succeeded in stating a theory which is free from objection. I propose to discuss in this section some of the theories recently suggested in explaining such complicated phenomena.

The simplest theory concerning the origin of the germinal variations was advanced by the English Royal commission for the study of the feeble-minded—that is the spontaneous theory. After careful investigation of the mental defectives in England, the Commission declared: "Both on the ground of fact and theory there is the highest degree of probability that feeble-mindedness is usually spontaneous in origin—that is, not due to influences acting on the parents—and tends strongly to be inherited."

I must confess that I fail to see any scientific value in this theory. It does not explain anything and throws no light upon further scientific research in this field. I may quote Huxley's statement on this matter. Huxley, in his "Essay on Perpetuation of Living Beings," said: "The third cause that I have to mention is a very extensive one. It is one that, for want of better name, has been called 'spontaneous variation,' which means that when we do not know anything about the cause of a phenomenon, we call it 'spontaneous.' In the orderly chain of causes and effects in this world, there are very few things of which it can be said with truth that they are spontaneous. Certainly not in these physical matters—in these there is nothing of the kind; everything depends on previous conditions. But when we can not trace the cause of phenomena, we call them spontaneous." In other words, "spontaneous variation" is but a dignified term for ignorance.

Dr. Davenport of the Eugenics Record Office at Cold Spring Harbor, New York, has recently advanced a theory that mental defectives are a completely differentiated race characterized by the absence of a unit character which is present in the normal human being. Thus he says: "It can not be admitted that feeble-mindedness is a personal and private matter. There is reason for believing that it is one of the oldest traits of mankind—a heritage from his ape-like ancestry. The feeble-mindedness of to-day is (for the most part) the dower of a germ-plasm common to hundreds of thousands of kin living and past; and if not controlled, that germ plasm may pass into hundreds of thousands of descendants. How can the product of a germ-plasm with such a history regard his traits as purely personal and private?" In another connection he again says, "The conclusion is forced upon us that the defects of this germ-plasm have surely come all the way down from man's ape-like ancestors, through two hundred generations or more. The germ-plasm that we are tracing remains relatively simple; it has never gained, or only temporarily, at most, the one or the many characteristics whose absence we call (quite inadequately) defects. Feeble-mindedness is thus an uninterrupted transmission from our animal ancestry. It is not reversion; it is direct inheritance."

Interesting is this theory, but we must accept it with a grain of salt. As we have seen before, that the chief characteristic of the mentally defective is their incapability of "competing on equal terms with their normal fellows or managing themselves or their affairs with ordinary prudence." Their lack of intelligence and will power and their inability to distinguish between right and wrong have made them incapable of adapting themselves to the environment in which they have to persist. They are unfit for survival, if we let them struggle for their own existence. The force of natural selection in human society has been made ineffective by our civilization. The feeble-minded exist to-day, because our humanitarian principles have dictated to us to keep them with great care. Our charitable institutions, state hospitals, state homes, asylums, and the like are all intended to help the unfit survive. They would perish, if we leave them alone. I can not conceive how the ape-like ancestors of men could have survived under the most ruthless conditions of natural selection in the dawn of human existence, had they been feeble-minded in the modern sense. Unless Dr. Davenport can enlighten us on the question just raised, his theory is certainly not in harmony with one of the biological principles—natural selection—which has been proved to be of universal validity at the present stage of our scientific knowledge.

The theory to which Dr. Davenport does not subscribe is that feeble-mindedness is a phenomenon of atavism or reversion. Based on the resemblance of the intellectual and social traits of the feeble-minded with those of our ape-like ancestors, some investigators in this field have concluded that feeble-mindedness is merely an example of reversion or back-sliding to the lower part of the phyletic scale of human development. Ingenious this theory is, but it presumes that in the phylogeny of civilized man there is a phase of evolution comparable with that of the feeble-minded. Whether this presumption is correct or not is still a question for further research.

Dr. Tredgold thinks that the origin of the germinal variation of mental deficiency is a pathological one. It is not spontaneous, nor a direct inheritance from man's ape-like ancestry, nor a phenomenon of atavism, but a result of diminution of spontaneity, or decrease of the intrinsic potentiality for normal development. This nature of vitiation does not manifest itself in the manner of mutation, but is brought about gradually by the adverse conditions of the environment. Thus he says: "The conclusion to which I have come is that amentia must be regarded, not as due to the absence or suppression of some specific germ determinant, but as resulting from a diminished germinal vitality, in consequence of which development tends to be incomplete. This lessened potentiality is especially marked in that constituent which determines the development of the central nervous system—the neuronic determinant—but it is often more widespread, and then affects other tissues of the body also. In other words, the inheritance takes the form of a neuropathic diathesis, or an innate predisposition to neuronic imperfection; the actual manifestation of this innate weakness, however,—that is, the form it assumes, being often dependent upon the nature of the environment."[4]

In elaborating his theory, Tredgold further postulates that progessive degrees of feeble-mindedness are due to the progressive impairment of the germ cells through the influence of environment. The first manifestation of neuropathic diathesis is found in the milder forms of neurosis or psychosis. Should this neurotic person marry another person similarly tainted, such germinal impairment would be further intensified and their offspring would be more neurotic than they are. Should such undesirable marriages continue in the later generations, feeble-minded offspring would make their appearance. Profound idiocy would be the final manifestation of this progressive neuropathic diathesis. The three degrees of feeble-mindedness may not happen in three successive generations. In most cases they do not. By careful selection at marriage such disastrous consequence may be avoided, or at least, delayed. But on the other hand, gross idiocy may appear in the very early generation in case the result of undesirable marriage is accentuated by some external factors.

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[4] Tredgold, A. F., Mental Deficiency, p. 25.

Based on the investigations of himself and others, Tredgold said; "Thus, in persons suffering from migraine, neurasthenia, and hysteria, it is uncommon to find marked ancestral nervous or psychic disorder; whilst a history of the parents suffering from alcoholism, phthisis, and modes of life attended by severe stress and strain is frequent. In the next grade—the milder form of epilepsy—neuropathic inheritance becomes more marked, and in the severe forms of this affection it is present, according to Sir William Gowers, is about 35 per cent of cases. In the next grade—insanity—Sir Thomas Clouston and Dr. J. S. Bolton have found neuropathic inheritance in from 50 to 60 per cent of cases, whilst in amentia, as I shall presently show, it occurs in 80 per cent of cases." [5]

Tredgold's theory gives explanation both to the origin of germinal variation which lies at the root of mental deficiency and the mode of its transmission. It has been objected to by biologists on the ground that it is in direct contradiction to Weismann's theory of inheritance. Since the germ cell, as shown by Weismann, is immutable and can not be affected by the conditions of environment, somatic changes can have no influence upon the germ cell. Should Tredgold's theory be true,—that is, feeble-mindedness is the result of germinal impairment, and germinal impairment is brought about by adverse environment—then Weismann's theory of the non-transmissibility of acquired characters must be discarded. This objection is a formidable one. However, the last word of biological science has not been said. There are still pros and cons concerning Weismann's theory in the field of biology. Quite a few investigations recently made upon the lower animals tend to show that there is at least a possibility of modifying the germ cells by environmental influences. Tredgold's theory may serve as a stimulation for further research.

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[5] Tredgold, A. F., Mental Deficiency, p. 34.

The next and the most common method in explaining the laws of transmission of hereditary feeble-mindedness is the Mendelian theory. At some time between 1855 and 1865 Gregor Mendel, an Austrian monk in the small village of Brünn, carried out a series of experiments on plant hybridization. He planted two kinds of peas in the gardens of his cloister, one of which was tall and the other dwarf. He was surprised by the fact that no matter how he cut out stamens and transferred the pollen from one variety to the pistils of the other, the result of this crossing in the first generation was that all of these plants were tall; none of them was dwarf. When he allowed these to grow by themselves and be fertilized naturally, raising the fruit and planting it again in the second year, he found that throughout his whole garden there were three tall ones to one dwarf. First generation, all tall; second generation, tall and dwarf in the ratio of three to one. Beside the tall and dwarf peas he crossed many other kinds of peas of pair characters; the result always remained the same.

Furthermore, he found that if he planted the peas from his dwarf plants he got all dwarfs. No matter how many times this process was repeated, the plants were always dwarf, never tall. This was not true with tall peas. They looked just alike, but when they were planted, one third of them always produced tall peas, no matter how many years they were replanted. But the other two-thirds always yielded tall and dwarf in the ratio of three to one.

With this remarkable fact on hand, Mendel began to formulate laws of inheritance. He called tallness, dwarfness, or other characteristics as the case may be, the "unit characters." The character which appeared in the first generation after cross-fertilization he called "dominant," while the one which did not appear until the second generation, "recessive." The recessive character was there in the first generation, but did not appear. In the second generation, the unit characters segregate again and the recessive ones reappear.

The most important points of the Mendelian theory are the purity of germ cells which are carriers of various determiners and the segregation of the unit characters in the second generation. Now we may ask, Does Mendelism apply to human traits as well?

To this question Drs. Davenport, Goodard, Rosanoff, Orr, and others, have declared that heredity of feeble-mindedness is in accord with the Mendelian principle in every particular. They have assumed that feeble-mindedness is a recessive character and stated that the actual findings of their investigation correspond very closely to the theoretical expectations according to the Mendelian formula. The laws of feeble-mindedness may be briefly stated as follows.

1. Both parents being normal and of pure ancestry, all children will be pure normal.
2. Both parents being feeble-minded, all children will be feeble-minded.
3. One parent being normal but carrying defective germ cells, and the other parent being feeble-minded, half of the children will be feeble-minded, and half will be normal but capable of transmitting the defect to their progeny.
4. One parent being normal and of pure normal ancestry and the other parent being feeble-minded, all children will be normal but capable of transmitting the defect to their progeny.
5. Both parents being normal but carrying the defective germ cells, one-fourth of the children will be pure normal, one-half will be apparently normal with the capability of transmitting the defect to their progeny, and the remaining one-fourth will be defective.
6. Both parents being normal, one of pure ancestry and the other with the defective germ cells, all children will be normal, but half of them will be capable and half incapable of transmitting the defect to their progeny.

To illustrate these laws numerous investigations have been made concerning the family pedigrees of the feeble-minded. It may not be out of place to quote a few unique studies made in recent years here.

The Kallikak Family [6]—Martin Kallikak was a youth of good family. "Just before attaining his majority, the young man joined one of the numerous military companies that were formed to protect the country at the beginning of the revolution. At one of the taverns frequented by the militia he met a feeble-minded girl by whom he became the father of a feeble-minded son. This child was given, by its mother, the name of the father in full, and thus has been handed down to posterity the father's name and the mother's mental capacity. This illegitimate boy was Martin Kallikak, Jr., . . . and from him have come four hundred and eighty descendants. One hundred and forty-three of these, we have conclusive proof, were or are feeble-minded, while only forty-six have been found normal. The rest are unknown or doubtful.

"Among these four hundred and eighty descendants, thirty-six have been illegitimate.

"There have been thirty-three sexually immoral persons, mostly prostitutes.

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[6] Goddard, H. H.—The Kallikak Family.

" There have been twenty-four confirmed alcoholics.

" There have been three epileptics.

" Eighty-two died in infancy.

"Three were criminal.

" Eight kept houses of ill fame.

" Martin Kallikak, Sr., on leaving the Revolutionary army, straightened up and married a respectable girl of good family, and through that union has come another line of descendants of radically different character. These now number four hundred and ninety-six in direct descent. All of them are normal people. Three men only have been found among them who were somewhat degenerate, but they were not defective . . . Indeed, in this family and its collateral branches, we find nothing but good representative citizenship. There are doctors, lawyers, judges, educators, traders, landholders, in short, respectable citizens, men and women prominent in every phase of social life."

The Hill Fork—This is a study of two family trees in a small Massachusetts town. Out of these families 737 persons were traced. It was known that 18 of these were illegitimate. Of the 82 married women known to the investigators, 14 had bastard children before marriage and 6 have had bastard children after marriage, or 24% of the married families. Criminal tendencies are clearly shown in 24 persons, and 16 have been convicted of crime. It has also been definitely proved that 136 persons were feeble-minded, and about 10% of the total number were epileptics. It was estimated that the Hill Fork families have in the last 60 years cost the state of Massachusetts, in charitable relief, care of feeble-minded, epileptic and insane, conviction and punishment for crime, at least one-half million dollars.

The Nam Family—This is a study of a family pedigree in the mountains of western Massachusetts. There were 784 Nams traced. Out of this number 187 were alcoholics, 232 women and 199 men were licentious, and 40 became prisoners. Although feeble-mindedness was not fully investigated in these families, the evidence is strong that it was a leading trait. It was estimated that the Nams have already cost the state nearly one and one-half million dollars.

In the above studies the authors have tried to show that feeble-mindedness is a recessive character and its transmission is in accordance with the Mendelian laws of inheritance. In some cases where the actual findings were at variance with the theoretical expectations, the authors attributed them to the incompleteness of their data rather than to the limitations of applying Mendelism to the heredity of mental traits. Should all the claims made by the Mendelism school be true, it would certainly not be extravagant to hope that feeble-mindedness could be entirely wiped out from the surface of the earth by a few generations of selective breeding. I am afraid that the transmission of human intellectual and moral characters might not be so simple as that of the tallness and shortness of peas. Now let us see what are the objections and difficulties which Mendelian school has to face with regard both to its method and theory.

In the first place, the data collected by the investigators of Mendelian school can not be accepted without reserve. The usual method employed in gathering data is to send out trained field workers to investigate the family trees of the institutional cases. The work has been very laborious and painstaking. One complete family pedigree may take weeks or months to obtain. The data obtained were usually from the testimony of the relatives and acquaintances of the person concerned. It is quite obvious that the chance for errors in using such method is very great. The reasons for this are twofold. (1) The probable error in rating a person as feeble-minded or normal, moral or immoral, is very great when the rating is made indirectly from the testimony of relatives or acquaintances, and still greater when the rating made in the same manner is concerning a person who has long been dead. (2) The potent suggestion of the influence of heredity upon feeble-mindedness may lead the field workers to be unconsciously unscientific in collecting the data. To substantiate my contention I may quote the following description of the method used by the Eugenics Record Office. " For example, by hypothesis, feeble-mindedness is for the most part a recessive trait, and the hypothesis must be tested as follows: the field worker finds a person suffering from feeble-mindedness,—a descendant of two normal parents—by hypothesis both of these parents are simplex; the field worker must understand that each parent will probably have somewhere in his or her ancestry a feeble-minded person, and it is the business of the field worker to make a special search for such person or persons in the pedigree."[7] It is hardly conceivable that the field worker should fail to be prejudiced in his method of investigation, when he is told to search for such and such person in order to prove the Mendelian theory.

In the second place, the small number of human offspring in a family makes the study of Mendelian heredity of human traits exceedingly difficult, if not impossible. Mendelian principles follow the law of probability. Only by a large number of offspring can the theoretical expectations of different matings have a chance to appear. When Mendel experimented with peas in his garden, he could have as many peas as he wanted. Indeed, he experimented with over ten thousand peas before he discovered his formula. This can not be done in a human family. When a normal person with defective germ cells marries a person similarly tainted, according to Mendelian expectation one-fourth of their children will be feeble-minded, one-fourth will be pure normal, and one-half will be apparently normal with the capacity of transmitting the defect to their progeny. Now suppose they only have one child; we know that this child has only one chance out of four to be a pure normal. But what he shall be, we have no way to tell. Even if they have four children, these four may all be mental defective, or all normal, or of any other possible combinations. In dealing with human heredity, we can not say that such and such law will manifest itself in any particular mating.

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[7] Eugenics Record Office—Bulletin No. 2.

In the third place, whether general intelligence is a unit character or not is still a question for debate. In all probability it is not. By pyschological tests it has been definitely established that individual difference with regard to mental traits is continuous. Men do not separate themselves into different types, as far as their mental traits are concerned. There is a continuous gradation of intelligence, from the most gifted genius to the most profound idiocy, each varying slightly from the next. When we use words like idiots, imbeciles, morons, dull-normal, normal, genius, and what not, we do not imply that there are some sharp lines of demarcation between them. At least we have no conclusive evidence to show that multiple-type individuals do actually exist. If intelligence is a unit character and feeble-mindedness is due to the absence of certain determiners which are present in the normal individuals, then we must have two definite groups of individuals, the normal group with the presence of determiners, and the feeble-minded group with the absence of them; each of them forms a perfectly homogeneous type. But such division is impossible; it is contrary to facts. Unless the advocates of Mendelian theory with regard to mental traits can definitely prove that general intelligence is a unit character, all arguments in defence of the theory seem to me to be pointless.

The fourth problem which Mendelian school has to face is, How the different degrees of feeble-mindedness are inherited. If feeble-mindedness is a recessive unit character, can we safely assume that low-grade feeble-mindedness is recessive to the high grade in the same manner as feeble-mindedness is to normality? For instance, if a man of moron grade marry an imbecile woman, can we say with certain degree of certainty that other-things being equal their children will be morons, because moronity is a dominant character in this case? As far as my knowledge goes, we have no data to throw any light on this point. Should Mendelian laws prove to be the true phenomena of the inheritance of human traits, I think the future line of research should be directed toward the solution of the problem just raised.

In the above paragraphs, I have tried to point out some of the difficulties in the application of Mendelian theory to the heredity of moral and intellectual traits. As biological science is still in its infancy, we shall have a long way to travel before we reach a point where we can speak with considerable certainty about the laws of the transmission of mental defect. However, the re-discovery of Mendelian principles has proved to be a greater advance in the biological science toward a rational explanation of inheritance than ever before. I dare to believe that the close cooperation between the biologists and psychologists will be able to discover the secret of nature in this field, although the task is a very difficult one.

4. Feeble-mindedness and Eugenics

So far I have confined my discussion to the characteristics, the classification, the causes, and the laws of transmission of feeble-mindedness. Now we may come to the practical problem of improving the human stock.

Scientific studies have shown that feeble-mindedness is the root of all social problems. To improve our society we must first try to improve the human race, and to improve the human race we must have selective breeding as we have done with the other animals. The best and the quickest way of eliminating feeble-mindedness from our society is to prevent the feeble-minded from reproducing their kind. But the problem of Eugenics is by no means a simple one. I shall try to point out some of the fundamental problems in this field.

First of all, let us ask, Should the feeble-minded person be allowed to marry? To this question Dr. Davenport has given a definite answer. Thus he says: "While the union of a normal man and a feeble-minded woman usually does not take the form of marriage, yet the case may arise in the future, as it has arisen in the past, where a mentally vigorous man wishes to marry a socially attractive and beautiful, though defective, woman. Such a marriage may be from the standpoint of Eugenics, as from any social view-point, quite permissible."[8] In another connection he again says: "Weakness in any trait should marry strength in that trait . . . Let abnormals marry normals without trace of the defect, and let their normal offspring marry in turn into strong strains; thus the defect may never appear again."[9]

On this Eugenic rule many investigators in this field have not agreed. The chief basis for such a Eugenic rule is the assumption that when a normal individual marries a feeble-minded person, all their children will be normal. But this assumption is by no means always correct. In the Kallikak family referred above, we know definitely that Kallikak, Jr. was the son of a normal father and a feeble-minded mother. According to Mendelian theory he should be a hybrid normal. But he was feeble-minded and transmitted his defect to hundreds of his direct descendants. Cases like this are of quite common occurrence in all the investigations, such as the Hill Fork, the Nam family, and other family pedigrees so far investigated. Dr. Davenport may defend his theory by saying that the normal persons in these cases are not pure normal; they are simplex; they carry in their germ cells defectiveness which lies latent and reappears whenever there is a chance. Granting that this is true, nevertheless since defectiveness in the germ cells may be latent for many generations, I see no reason why normal individuals should take the chance of marrying members of tainted stock.

In general we may say that the application of Dr. Davenport's theory will result, at best, in extending the range of latency of feeble-mindedness in future generations, and in hiding defectiveness behind the apparent normality of the offspring. The recrudescence of the pathological condition may take place at any time whenever the apparently normal person with defective germ cells should unfortunately marry a person of his own kind.

The next and the most difficult question we should like to ask is: Should the simplex individual be allowed to marry? Theoretically we can say 'no,' but practically this can not be done at the present stage of our social consciousness and biological knowledge.

There are two great difficulties in our way in denying marriage to the simplex individual. The first difficulty we have to meet is public opposition. The science of Eugenics is only a few decades old. Eugenical knowledge has not been widely spread. Eugenical conscience of the general public has not been completely aroused. We may segregate, asexualize, or make any other provisions to prevent feeble-minded persons from becoming parents during their procreative age. In doing this we have public opinion with us, because the general intelligence of the public is ready to accept the principle that the union of the two feeble-minded persons will result in feeble-minded children, and thus increase the burden of society for their support. But, on the other hand, the opposition of the public would be overwhelmingly great, if any legislature should try to rule against the marriage of individuals who possess normal mentality and good physical constitution, on the ground of their innate capacity of transmitting feeble-mindedness to offspring. The eugenists have to educate the public on this vital problem, before any measure of this kind can ever be attempted.

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[8] Eugenics Record Office—Bulletin No. 9, p. 12.

[9] Castle and others.—Heredity and Eugenics, p. 286.

The second difficulty in preventing such marriage lies in the recognition of the simplex cases. Our present knowledge of eugenical principles offers us no help in this respect. We may take one of the cases in the Mendelian theory for illustration. When a simplex individual marries another person of normal ancestry, according to Mendelian theory, all their offspring will be normal. But these normal children are not all alike in the nature of the germ cells they carry; two of them are pure normal, but the other two are simplex again. Which two of them are pure normal is beyond our knowledge to tell. There is absolutely no earmark for such differentiation. The same is true when the children of the two simplex individuals are considered. Unless we can find some way to distinguish the pure normal from the simplex, any legislative measure in denying marriage to the latter will lead to gross injustice in its application.

The third practical problem of Eugenics is, What grade of feeble-mindedness should not be allowed to marry? As I have mentioned above, there is no hard and fast line of distinction between feeble-mindedness and normality. There are all grades of intelligence from practically none up to that of a genius. Where should the line be drawn for discrimination when we try to put a eugenical program into practice? The idiots and imbeciles do not constitute our eugenical problem, because they can easily be recognized and brought into public institutions. But how about the high-grade morons and the borderline cases? Should they be allowed to marry and to reproduce their kind? Certainly not, should our eugenical rule be strictly scientific. But how are they to be recognized? To this question the Binet psychologists have given a definitie answer. But the reliability of the Intelligence tests is by no means absolute. Many great masters of psychology have questioned the value of Intelligence Tests as a means of mental diagnosis. To be sure, they are one of the best means of approach in identifying and grading feeble-mindedness at our disposal. Far be it from me to minimize their usefulness in the field of education and psychology, but their degree of reliability does not warrant our unqualified reliance.

Furthermore, the terms used in describing high-grade feeble-mindedness are often devoid of exact meaning. In recent literature about mental deficiency the following terms, such as impracticalness, inadventurousness, disheartedness, incorrigibleness, quarrelsomeness, criminal propensities, sexual perversities, and the like, are often used. What do they really mean in their last analysis? Are they the special characteristics of the weak-minded and absent in the normal individuals? It seems to me that these terms are very misleading and represent a confession of ignorance. Unless we have more exact knowledge concerning high-grade feeble-mindedness, all our efforts in denying the privilege of marriage or parenthood to those who are backward in intellectual faculties would be unjust and impracticable.

From this general discussion of the fundamental problems of Eugenics it is quite clear that the effort of the eugenists should be directed along the following three lines. First, to secure legislation against marriage of those persons whose offspring will surely be defective. This task is comparatively easy to accomplish, because the public of any civilized community has generally recognized the significance of this measure. Secondly, to search for more exact knowledge than what we have at present about the nature, the origin, and the modes of transmission of feeble-mindedness. This point can never be over-emphasized. Every eugenical measure is dependent upon the success of this kind of research. Thirdly, to appeal to intelligent young men and young women not to marry into families where there is a defective hereditary trait. We can not prevent simplex individuals or high-grade mental defectives from marriage through legal means, but we can at least warn normal individuals to be careful in their selection of mates and to fall in love intelligently. Slowly but surely this educational propaganda concerning this vital but perplexed problem will bring good results.

In conclusion, I may quote the statements of Mr. Arthur Holmes which seem to me to be an excellent advice for the young people on the question of marriage. Holmes,[10] in his lecture on "The First Law of Character-making" says: "Falling in love is at least as serious a step as crossing a railroad track. There you are bidden to 'Stop, look, and listen.' That you should do here. Then if you must fall in love, but for heaven's sake, see more in the young lady than a retroussé nose and a lisp, or in the young man, than a cow-lick and a smooth knobbed cane. You may think you can marry the nose and the lisp, or the cow-lick and the cane alone, but unfortunately you can not. The woman or the man is thrown in with the bargain, you have to live with one or the other.

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[10] Eugenics: Twelve University Lectures, p. 199.

"That, however, is not the whole calamity. You can't marry a retroussé nose without marrying the girl and her father and mother, and grandfathers and grandmothers and all her uncles and her cousins and her aunts in the jail, the poor house, the asylum, and the graveyard. . . . .

"Marriage possesses so few possibilities for the universally expected foolish happiness, so many possibilities of untold woe, and so many potentialities for the largest, strongest, tenderest life two people can live on earth, that it deserves the sincerest consideration possible to be given it."

BIBLIOGRAPHY

BATESON, W. Mendel's Principles of Heredity. Cambridge University Press, London, 1909, p. 384.

BENTLEY, MADISON. Mental Inheritance. *Pop. Sci. Mo.* Vol. 75, pp. 458-468.

DAVENPORT, C. B. Heredity in Relation to Eugenics. Henry Holt and Co., New York, 1911, p. 298.

—— ——. Control of Mental Defectiveness. *Pop. Sci. Mo.*, Jan., 1912.

——, CASTLE, AND OTHERS. Heredity and Eugenics. Univ. of Chicago Press, Chicago, Ill., 1912, p. 310.

—— AND DANIELSON. The Hill Fork. Eugenics Record Office, Memoir No. 1., 1912, p. 56.

—— AND ESTABROOK. The Nam Family. Eugenics Record Office, Memoir No. 2, 1912, p. 85.

DRAPERS' Co. Memoirs V.

—— ——. Questions of the Day and the Fray.—II, VII, VIII, IX.

DUGDALE, R. L. The Jukes, 1910. G. P. Putnam's Sons, New York, p. 120.

EUGENICS RECORD OFFICE. Bulletins I, III, IV, VIII, XI.

——. TWELVE UNIVERSITY LECTURES. Dodd, Mead and Co., New York, 1914, p. 342.

GALTON'S EUGENICS LAB. Memoirs I. II, VIII.

GALTON, FRANCIS. Hereditary Genius. Macmillan Co., London, 1892, p. 368.

—— ——. Essays in Eugenics. The Eug. Educ. Society, London, 1909, p. 109.

—— ——. Natural Inheritance. Macmillan Co., London, 1889, p. 254.

EUGENICS LABORATORY LECTURE SERIES. London. I-X inclusive.

GODDARD, H. H. Feeble-mindedness. Its Causes and Consequences. Macmillan Co., New York, 1914, p. 599.

—— ——. The Kallikak Family. Macmillan Co., New York. 1912. p. 117.

—— ——. The Criminal Imbeciles. Macmillan Co., 1915, p. 154.

Herbert, S. The First Principles of Heredity. Macmillan Co., New York.

Mott. Heredity and Insanity. *Eugenics Review.* Vol. II, pp. 257-281.

Norsworthy, Naomi. The Psychology of Mentally Deficient Children. *Archives of Psychology,* Nov., 1906.

Patteen, Simon N. Heredity and Social Progress. Macmillan Co., New York, 1903, p. 214.

Punnett, R. C. Mendelism. Macmillan Co., New York, 1911, p. 173.

Reid, G. Archdall. The Laws of Heredity. Macmillan Co., New York 1910 p. 548.

Rutherford W. J. A Family of Degenerates. *Mendel Jour.,* Sept. 1912.

Segrim, Edward. Idiocy: Treatment by Physiological Method. Teachers College, Columbia Univ., New York, 1907, p. 202.

Spearman, C. N. The Heredity of Abilities. *Eugenics Review,* Vol. 6, pp. 219-237.

Winship, A. E. Jukes-Edwards. 1900.

Tredgold, A. F. Mental Deficiency. Bailliere, Tindall and Cox, London. 1914.

Thorndike, E. L. Heredity. Correlation and Sex Difference in School Ability. Macmillan Co.. 1903, p. 60.

THE CHILD AND SCHOOL ENTRANCE

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Growth is a fundamental process of life. The nature of this process in the child has long attracted the attention of students, and numerous facts regarding the shifting developmental stages have been determined. These facts, however, are more or less unrelated, and on the future investigator in this field devolves not only the task of discovering new facts to render a fuller account of the process of growth, but also, of correlating such facts with those already known, in order to cast them in true and significant relief.

Growth during pre-natal life is exceedingly rapid. In fact no period after birth can approximate this rapid growth from a single cell to 5,000,000 times its size at birth. We have come to recognize post-natal growth as consisting of alternating periods of acceleration and retardation. Minot (54) is not cognizant of such varying stages in the rate of growth in characterizing life as a process of gradual decline with age in the rate of metabolism due to the decrease of the relative amount of nucleus in relation to cytoplasm in the cells of the soma. The greatest absolute annual growth after birth takes place during the first year. Extensive investigations demonstrate that growth is very rapid during the first year or so after birth, after which there is a more or less uniform rate of growth until about 10 or 11 years in girls and 1 or 2 years subsequent in boys, when a distinct acceleration takes place. The maximum of increased growth occurs at about 12 in girls and about 2 years later in boys.

During early childhood several minor periods of acceleration are noted. Investigations before school entrance are meagre, hence only general statements are warranted. The second year of life is generally represented as less rapid and attended by somewhat less marked changes than the first. At the beginning of the third year, Christopher (22 p. 328) observed a change of the bodily proportions in a loss of rotundity and plumpness. Following this there is a period of more or less regular rate of growth until about the age of 5 or 6, when a rather distinct quickening takes place in various parts. The absolute annual height and weight values are augmented, changes in dentition are in progress, and various phenomena of growth show alterations and irregularities in their procedure from about 5 to 7 years.

A glimpse into the investigations of such men as Crampton (25, 26, 27, 28) and Baldwin (3, 4) shows that physiological development does not proceed at a uniform rate in different individuals. Some reach accelerated periods younger than others and some pass through these periods more rapidly. They indicate, further, that the widest variation of individuals occurs at the stage of most marked acceleration—at puberty. But at the age of 6 these irregularities are quite noticeable and many inherent or environmental factors contribute to make them more significant, viz.—nationality, climate, relative social and economic status of parents, heredity, urban or rural environment, general health conditions, normal or abnormal mentally, nutrition, functioning of endocrine glands, size of families, et cetera. Variation of any of these influences may retard or accelerate physiological development. It is noteworthy, however, that in cases where some environmental factor has retarded growth, when the stage of acceleration is reached, there is an added rush as if to compensate for the time lost.

A more adequate understanding of the variable rates of growth, and an appreciation of the complexity with which growth and development take place, have antiquated the usage of chronological age as the basis of child study and a new principle has been adopted. Physiological age attempts to take account of the various factors of growth and to classify children on the basis of their physiological maturity rather than on that of years. This new standard has been demonstrated as practicable and bids fair to account well for many discrepancies to which chronological age could not be adjusted.

The changing conditions of growth at school entrance need further careful investigation before we shall gain an adequate understanding of the processes of growth at this stage and their pedagogic and hygienic imports, but it may be worth while to bring together the most significant changes, which have already been pointed out, and follow this by some deductions concerning the hygiene and pedagogy of the child at this stage of development. Our first task, then, is the enumeration of the facts of growth at this apparently accelerated period.

I. Physiological Development

Height. According to Burk (16 p. 256) the average height of the child at 6 years is 44 or 45 inches. In Hamburg, Steinhaus (66 p. 20ff) found the average height of boys at school entrance from 114 to 117 centimeters and from 115 to 116 centimeters in girls. In Breslau these averages were reduced several centimeters. Englesperger and Ziegler (36 p. 184) give the averages of boys as 111.05, of girls as 110.03 centimeters.

The tables of Bowditch (11, 12) and Porter (56) show acceleration in height at 6 or 7 years. Boas (9 p. 188) found the annual increase in stature at 6 years greater than at later yearly periods before puberty. The increment in girls was slightly greater than in boys. Similarly, Schmid-Monard (63 p. 362) found increase in the annual growth in stature at about 6; and the acceleration occurs in girls slightly earlier than in boys.

The significant thing in any period of irregular or accelerated growth is the wide variation from the norm, that some attain the stage at an earlier age than others. Morever, some pass the stage more rapidly than others, and the rates of increment in individuals show no regularity. Let us note what facts we have as to these irregularities here. Most of the early workers made general averages, and these are of no value in such a study. In recent years a few studies show the individual variations very significantly.

Steinhaus (66 p. 20ff) measured 5914 children at school entrance and found the width of variation from 90 to 130 centimeters. 110 centimeters is sometimes given as the average height at 6 years, and from his figures 41.64 per cent are above and 58.36 below this average. The majority of the children fell within the limits 100 to 120 centimeters, but the width of variation at this early age is very significant.

Quirsfeld (66 p. 22) found the variation here from 98 to 127 centimeters, and the figures of Stephanis show boys varying from 101.7 to 124.5 centimeters, and girls from 99.5 to 123.9 centimeters. According to Englesperger and Ziegler (36 p. 183) the minimal height measurement of boys at school entrance was 96 and of girls 98 centimeters. The maximal height measurement of boys was 125 and of girls 126 centimeters. The majority of the boys were grouped within the height measurements of 107 to 118 centimeters, and most of the girls varied within the limits of 105 to 117 centimeters. They found growth at this period very irregular and individual differences more marked.

The statement of Baldwin in his recent extensive investigation is highly suggestive and corroborative of the inferences of earlier workers in this field. "From the years 6 to 13.5 the yearly increment in height varies from 1 to 8 or 9.5 centimeters. The increase from 6 to 7.5 years has no uniformity, and seems to depend on the individual. From the years 8 to 12 the usual increase is from 7 to 9 centimeters. Here too is the greatest uniformity of increase, that is, more boys increase the same number of centimeters than at any other time." (4 p. 23)

Weight.—Weight in itself is not accepted as a very reliable index of growth. Unlike height, weight may continue to accrue up to old age, and also, once gained, it may be lost. But, taken with height, vital capacity, and other measurements, it becomes an important factor of growth, and indicates strength and state of health in a very obvious way.

The tables of Bowditch (11,12) show an average weight of 20 kilograms or about 45 pounds for boys at 6 years. Stratz gives averages of 19 kilograms for boys, and one kilogram less for girls. Steinhaus (66 p. 27) says the average at this age falls between 18 and 20 kilograms. Burk (16 p. 260) says boys are slightly heavier than girls at this age. Englesperger and Ziegler (36 p. 194) found the following facts as to weight at school entrance.

	Boys	Girls
Mean weight	18.39 kg.	18.22 kg.
Minimum weight	13.51 "	13.01 "
Maximum weight	24.00 "	24.00 "
Variation	10.49 "	10.99 "

According to Quirsfeld (66 p. 24) the variation in individuals extends from 12 to 27 kilograms. 75.4 per cent of the children measured by him had an average weight of 19.5 kilograms. Schmid-Monard (63 p. 362) found that boys gain 1.7 kilograms between 4 and 5 years, 1.9 kilograms between 5 and 6 years, and 2.2 kilograms between 6 and 7 years. The girls gain 1.4 kilograms between 4 and 5 years, 1.9 kilograms between 5 and 6 years, and 1.9 kilograms again between 6 and 7 years. Baldwin (4 p. 24) characterises growth in weight at this period in this manner: "From the years 6 to 7.5 there is little uniformity in weight increment, for it varies all the way from 2 to 15 kilograms. At 7.5 years the increase begins to be a little more uniform, and a rough average can be taken. This is about 4 kilograms."

These facts indicate that the rate of increase of some children is much more rapid than others, some gaining only 2 kilograms while others increase as much as 15. This appears indicative of an accelerated stage of development to which some attain prior to others. But in the weight factor we must not overlook the gross individual differences which may occur, when we consider its value as an index of growth.

Many of the early writers pointed out the possibility of a node at about 6 or 7 or even 8 years, and some used this as a distinct dividing line in growth and development. But only recently have many determinative data been obtained, and much more work will be necessary, particularly in the period prior to school entrance, before very definite statements can be made. But it seems obvious that there is a rather marked period of acceleration at this time, and the lack of uniformity of increments in height and weight bears evidence that the growth and development of the individual assumes new aspects now, and that various individuals attain this stage at different ages, and these facts render chronological age impracticable for our classification of children in such a node of variability.

As previously indicated, the width of variation and the individual differences in the rate of growth are points of special significance. Bowditch states that the large children show accelerated development at the nodes earlier than the smaller ones. (4 p. 36ff). Boas, however, does not find such an inference warranted. Porter (56) has maintained that children who pass the nodes earlier in physiological development are also more advanced mentally. He found that the larger children at a given age, not only grow faster at the nodes, which they reach earlier, but they also make higher marks in their school work and pass their grades younger. Schmidt (63 p. 379), in an investigation of 2118 boys and 2142 girls, discovered that the farther children are developed physiologically the better they stand in their classes. Baldwin also found the taller, heavier and stronger children at any period better developed physiologically, and they show increment in growth at the nodes of 6 and at puberty prior to the smaller and shorter ones. He states that children who have school medical inspection, and properly directed play and physical training reach these stages earlier. He found that the groups he studied surpassed the old averages and he attributes it to these factors. He is inclined to agree with Porter and Schmidt that the mental and physiological ages run parallel in their development. At least, there seems to be a positive correlation of physiological development and school progress.

Dentition—We find a most decided state of transition regarding dentition at about the age of 6. Most observers attest that the temporary teeth continue their calcination until about the age of 5, when rapid processes of resorption set in. At about 6 the first of the permanent teeth,—the first molar,—appears. Shortly thereafter and in close intervals the median and lateral incisors erupt. It is patent, then, that we have here a diverse state regarding dentition. Some teeth are undergoing resorption and some are no more than mere shells, while new teeth appear in place of some of the old ones; and, most significant of all, is the appearance of a new type of tooth, which assumes a position farther back in the jaw than any of the preceding deciduous teeth. All investigators seem to confirm the law that the first permanent molar marks the transition from the deciduous to the permanent teeth, excepting three cases in a German study by Berten reported by Beik (7 p. 293). It is also generally accepted that girls erupt their first permanent teeth slightly earlier than boys.

The sixth year molar whose eruption marks this transition, is unique, first, in that it is the first of the permanent teeth to appear; second, in that it is the first tooth to appear in the jaw, which has had no predecessor in position in the temporary set; and third, in that it is a distinctly new type of tooth. Moreover, it comes into function when all the deciduous teeth have passed their climactic stage and are declining, some being no more than mere shells; consequently, the functioning of this tooth has now an important rôle. It is larger and broader tooth, and is quite different from any of the deciduous teeth. Hence, its form, position, and the need of its function, now, when the temporary teeth are in resorption stages, means a new procedure in chewing, and likely a changed condition of food transterred to the stomach. Furthermore, the development of the jaw subsequent to this alteration must assume a new situation. Dr. Hall (41 p. 77) says: "The deciduous teeth are more primitive in type, and the molars are less useful in warfare, but suggest a change in food habits, and involve greater length of jaw to make room for them and greater strength of muscle."

Bean (6) made a study pertaining to the time of eruption of the teeth in Filipino, German and American children. In American Boys the variation in eruption of the first molar in the upper jaw was from 6 to 9 and in the lower jaw from 6 to 8 years; in girls the variation in the upper jaw from 6 to 8, and from 5 to 8 years in the lower. He found girls more precocious than boys in the eruption of the permanent teeth. The Filipino children were more precocious than either of the other nationalities, and the American children, in general, were slightly earlier in eruption than the Germans. The work of Welcker (75) also shows the Germans a little less precocious than Americans. American children show the greatest variability between the eruption in boys and girls. Postponement in the appearance of the teeth may be due to factors in physical development being impeded, such as nutrition, condition of the temporary teeth, et cetera.

Some regard the new molar as the fundamental factor in the general transition here. It is obviously one of the most significant factors appearing at this time. Bean has suggested that we classify this period as well as the period at puberty on the basis of the appearance of the first and second molars respectively. He maintains that their importance is adequate to warrant their sole usage as the standard of determining physiological age. But the facts at hand hardly justify the postulation of any single factor as a criterion sufficient to determine the stage of physiological development of the entire organism. The process is apparently more complex, and the data from all the parts of the organism should be obtained and considered for a satisfactory determination.

The Jaws—The views regarding growth of the jaws at this period are not uniform in all particulars. All investigators concede that there is prolongation at this period in the posterior parts of the jaw and alveolar processes to make room for the new type tooth and the other molars appearing later in the back part of the jaw. The views seem rather conflicting, regarding growth in the anterior parts. Hunter, Fox, Humphrey and others have maintained that there is no growth in the anterior regions (80). Harris (80 p. 370) tried to ascertain whether the permanent teeth, which replace the deciduous set, occupy any additional room, and found that on the whole the permanent teeth occupy just a little more space than the corresponding deciduous teeth. Zsigmondy (80) also found a slight increase in space necessary for the permanent teeth.

Zsigmondy, Wedl, Bell and others report that there is a noticeable change in the outline of the arches of the upper jaw at second dentition. The upper jaw, which in early childhood formed a half circle, assumes a figure like the segment of an ellipse at second dentition. Less marked alterations occur in the general outline of the lower jaw.

Delabarre and Zsigmondy (80), in France and Germany respectively, observed rather significant separation of the temporary teeth, particularly in the case of incisors, coincident with the approach and progress of second dentition. The former investigator suggested that where this separation of the teeth did not take place at about 5 to 6 years, the children were threatened with iregularities and abnormalities of second dentition.

The Face—Changes in face proportions would naturally be presupposed, at the period of second denition. In measurements of children of various nationalities Röse (7 p. 299) found a lengthening of the face at a rapid rate at this time. Dr. Hall (41 p.72ff) states that beginning at 6 years new proportions of the face are assumed. In a study of children of Worcester, Mass., West (77) found three distinct periods of growth of the face particularly characteristic of girls. The first of these ends at 7 years. He noted that the transition from one period to the other was very abrupt and attended by peculiar alterations. In general, there is a sudden disappearance of the lower widths of the face, and a reduction of the distinctly childish features. The width of the face makes a change to almost adult dimensions. Growth proceeds more rapidly and in new directions after reaching the transitional stage. The changes in facial proportions of boys follow those of girls in a general way, but the transition from one stage to another is less abrupt.

The Brain—Practically all statements regarding the growth of the brain are referred to the tables of Vierordt. Basing his conclusions upon this study, Donaldson (34 p. 104) says the encephalon practically completes its growth in weight by the age of 7. President Hall (41 p. 105) states that the brain completes its rapid growth by the age of 6 and its weight and size is almost finished then. Subsequent to this, growth is very slow. We have no indication of nodality in growth of this organ, but it is significant that the growth in weight and size is practically completed and the further development takes place in internal ramifications and connections between the various centers.

The Skull.—Some evidence of transition regarding growth of the skull is also noticed at this time. Quoting from Quain's Anatomy (15 p. 128): "The skull grows rapidly during about the first seven years of life—. By that time certain parts—including the circumference of the occipital foramen, the body of the sphenoid, the cribriform plate, and the petrous division of the temporal—have atttained their definite size. The postauricular part of the skull enlarges more than the preauricular in the early years."

Landois (53 p. 984) says the ethmoid bone fuses with the neighboring bones of the skull between 5 and 6 years. Topinard (72 p. 133) states that, " About the fifth or sixth year the suture which separates the external occipital portions of the occipital shell is closed."

The Circulatory System—Some studies show alterations in the circulatory system at about this period. Investigations have convinced Gundobin (38 p. 100) that there are three periods of " Herzdämpfung," or retardation of the heart in childhood, viz.—during the first year, from 1 to 6, and from 6 to 12 years. Beneke found a diminution of the rate of growth of the heart begining at 6 and extending to 12 years. According to Tyler (74 p. 82) the growth of the heart proceeds very rapidly the first five years of life after which the rate is diminished markedly until puberty. The arteries are relatively large in childhood but grow much more slowly and thus the ratio between heart and arteries is constantly diverging.

Eminet (38 p. 121) found two periods of distinct rise in blood pressure. The rise is quite noticeable at 6, becomes much lower at 9, shows fluctuation between 11 and 12, and reaches its greatest height between 14 and 15 years. Vierordt suggested a sex difference in pulse frequency at about 6 years. Karnitzski found the specific gravity of the blood increased gradually between 6 and 8 years, and according to Leichtenstern the minimal hemoglobin quantity in the blood is at 5 years of age (38 p. 100). Perlin (55a) suggests an increase in hemoglobin quantity beginning at 6 and extending to 15 years.

It is obvious that these facts are more or less unrelated, but if corroborated and amplified by further investigations, there is significant indication of more or less general changes in the circulatory system at about the age of 6.

Gundobin (38 p. 238) concludes from investigation that the suprarenal glands show marked growth at 6 years and still greater at puberty.

Motor Control.—A few facts indicate transition in motor coordinations and neuro-muscular control. Hancock tested central steadiness from the ages of 5-7 by having the children stand with feet together and fixate a distant object. He discovered that the girls increase 32 or 33 per cent in steadiness and the boys from 15 to 16 per cent within these two years. This superiority of the girls is commensurable with our general law of disparity of growth between the sexes. Hancock also measured the quantitative unsteadiness by the tremograph and found an increase of about 50 per cent in boys and slightly less in girls. (17 p. 58). Burk concludes that girls of 6 years are more rapid in arm and hand movements due to their precocious development in general as compared with the boys. They gain a larger percentage of their total strength before 6 years than boys. Bryan (13) studied the improvement in precision of up and down writing movements in children between the ages of 6 and 16. Of the total increase in precision between these years, almost one-half was gained until the age of 8. This indicates a much more rapid motor coordinating period between 6 and 8 than in the periods of late childhood and early adolescence. A few other facts have bearing in this connection. Conradi (23) has stated that speech disorders after 6 years are to be regarded as pathological, thus intimating a stage of rather definite motor coordination some where before this time and a greater likelihood that the disorder will remain permanent hereafter. Gutzman (40 p. 51) finds a widening of the range of the voice at 7 years and the case is more marked in girls than in boys. From these facts we infer that the motor coordinations of the speech function pass a nascent stage of development at about the age of 6.

The Larynx.—Gundobin found that the larynx grows rapidly until about the age of 5. From this time on, the most noticeable feature was that in boys it pushed forward into prominence, while in girls it became less perceptible. The first sex difference may be noticed as early as the third year but not until the age of 7 does this become very perceptible. Cunningham says that the larynx grows regularly and uniformly until 6 years, when growth ceases until puberty, where very rapid development takes place. (29 p. 972). Barth (5 p. 86) also found that growth of this organ is rapid to 6 years. Contrary to the recent discovery of Gundobin, Barth did not find sex differences noticeable, at least, until 14 years. Gutzman, as already observed, found a widening of the range of voice at about 7. The fact that growth ceases at about 5 or 6 and that the voice widens at about 6 or 7 years leads one to infer that there is a transition at this period from a predominance of structural growth to a stage of functional development of speech.

The Eyes.—We have a few facts suggestive of important changes in the development of the eye during this period. Merkel found that the horizontal breadth of the iris reaches its full size at about 6 years. (7 p. 304) Miss Sayer thinks that the ability to use binocular vision effectively and in such a way as to fuse the images of the two eyes perfectly becomes possible between 6 and 9 years. In passing through this stage of transition the child is apt to squint and he may do it to such an extent that it becomes a habit.

As many investigations have shown, the eye of the young child is hypermetropic. Woinoff (38 p. 522) has pointed out that the main difference between the child and the adult eye consists not in a change in the curvature of the eye as some have held, but in a change in the distance from the refracting medium. Adamjuk suggests that the child must be protected while changes in the visual organ are in progress. These changes cease between 8 and 12 years. Gundobin concludes that the child should not start to school until at least 7 years, or after the time when these changes are well advanced and eye strain is not apt to occur. Tyler (74 p. 142) states that the ability of accommodation and convergence of the eye to different distances is very marked at the time of school entrance. These facts lead us to believe that the eyes are undergoing rather significant and rapid changes at about the time that we ordinarily introduce the child to school instruction.

Metabolism—It is an ordinary observance that children require an additional amount of food relative to their size, particularly during periods of rapid growth. This has been erroneously interpreted by some to signify that the child grows in proportion to the amount of food consumed. Metabolism in childhood is accelerated and more heat and waste products of oxidation and catabolism are produced partly, as Camerer and Rubner hold, due to the fact that the child has a relatively greater body surface, and, partly due, as Kassowitz maintains, to the fact that the reflex arcs through which the energy is expended are shorter, and consequently, the activity greater. Tyler (74 p. 86) states that the child of 5 or 6 years produces twice as much heat per pound as the adult, and the infant produces even more. In infancy the supply of food is relatively greatest, but the smallest amount is oxidised in the muscular and nervous tissues. Emphasizing the genetic view point, he holds that the energy is appropriated to the more vital processes in the early years. Because of this genetic development, food is a paramount factor in the psychic life of the child. This concurs with the fact that the visceral organs grow relatively more rapidly in early childhood and that the higher and more voluntary functions develop later. According to Camerer (20a) there is a decided increase in the number of foods demanded at about the age of 5. Prior to this just a few foods seem to appeal to the appetite of the child, while now the varieties multiply.

Besides these facts of nutrition and their distribution to the various functions, Gundobin (38 p. 381) found a change in the constituents of the urine from 5 to 6 years. The percentage of urea per kilogram increases to 5 or 6 years and then diminishes. This age is also characterised by the smallest quantity of unoxidised assimulative matter in the urine.

Thorax.—Gundobin and Bondyreff (38: 137) have found that as a rule the thorax is circular with its widest base below up to 6 or 7 years in girls and just a little later in boys. After this time the broader base is at the upper part of the thorax. Throughout this period, and perhaps earlier, the thorax is becoming broader in proportion to the thickness through the chest.

The Roentgen Ray Method under the pioneer efforts of Dr. Rotch, (60, 61), formerly of Harvard, and Prof. Pryor, (57), of Kentucky, have portrayed some facts of the development of the epiphyses of the osseous structures at this period. Three of the small carpal bones make their appearance in the hand and wrist from about 5 to 6 years, viz., the scaphoid, trapezoid and trapezium. Besides these carpals, the lower epiphysis of the ulna appears at 6 in girls and at 7 in boys. There is a regular order of appearance of all the carpals except the three which appear at this period. Usually not so many appear within such a short lapse of time. Hence this age is characterised by the appearance of more of the carpals, whose order is not uniform, consequently, indicating some irregularity of osseous development.

This enumeration of changes in the anatomical and physiological development at this period seem highly indicative of more or less general alterations, which further investigations will need to establish more definitely or disprove. The facts taken as a whole are representative of the general development of the organism and have suggested the probability of a condition of life when puberty may have been attained at such an early age. The conclusion of President Hall regarding this period is significant: "Indeed, there are a few faint indications set forth in the text of a yet earlier age nodality or meristic segmentation, as if amid the increased instabilities of health at the age of about 6 we could still detect the ripple-marks of an ancient public beach now lifted high above the tides of a receding shore-line as human infancy has been prolonged." (41 p. X).

II. Mental Development

In turning from the physiological to the mental characteristics of development, we find some interesting facts but no very significant and sharply delineated indications of transition. It appears that the mental development makes more steady progress throughout childhood. It is true, however, that certain psychical characteristics dominate the mental processes in certain more or less loosely defined periods, as in the case of imagination, perhaps, the most characteristic of all the mental processes from 4 to 7 years. Some investigators note the disclosure of new mental characteristics about this time, and many authors classify childhood with a dividing line at 6 or 7. There is, however, a difference in interpretation of the nascent tendencies. We shall attempt to present briefly the equipment of the child's mind at this period and indicate the mental traits, which now begin to come to the foreground and play a more or less significant rôle in his mind and life. Considerable study has been made of the mental content of children at school entrance, the first in America being carried out about 1880 by Pres. Hall (43). Englesperger and Ziegler have made very extensive investigations in Germany along the same line.

Just before this period, the chief mental interests of the child have been sensory, and he has been developing concepts, which are often not distinguished from percepts, even at the time of his entrance into school. Imitation is exibited in no small degree in all his activities. But he is a being to himself and all his interests seem to center in himself. The independence of his interests and actions are so characteristic that Kirkpatrick (51 p. 111) has termed this the " Period of Individualization."

At about 6 years some changes in the conduct of the child are noted, the chief of which, perhaps, is an incipient tendency to recognize others in plays and exercises. The child begins to compete with other children and his interests tend to become more socialized. This social tendency becomes more and more dominant throughout this period to puberty, and is the basis of Kirkpatrick's (51 p. 169) suggesting this period as a ripe time for introducing the child to formal instruction. Dr. Tanner (67 p. 25) observes that the fibres of the brain are now developing connections between the various centers in a rapid manner, and in consequence we notice mental changes in the child. " He has more interests, he plays more kinds of games, and he has a wider range of friends than before." His activities begin to go out in more manifold directions and there is general, through rather steady, mental expansion.

Dumville (35 p. 145) does not think there is any qualitative change in mentality at this period. He notes a slight increase in the ability to concentrate the attention over longer lapses of time. Also, the range of ideas begin to widen rapidly. He notes, further, that the child begins to show social tendencies in his interests and games. But, there is no sudden change, nor is there a qualitative increase of mental processes. The change occurring consists in a gradual transformation of processes already present and a greater facility of using them. A somewhat similar view is held by Thorndike (71 p. 92). " The six year old has all the elementary feelings involved in reasoning. The change which occurs is not the appearance of these feelings but their increase in number and in definiteness and a change in their manner of use."

Meumann (52a p. 107) states that the attention of children at school entrance passes rapidly from one object to another and is very easily diverted. Sustained attention is almost impossible with most children, and if attempted, produces fatigue very rapidly. Bagley (2a p. 188) says passive attention is characteristic at this period but soon active attention begins to function also.

The interests of the child are described by Nagy (65 p. 391) as being subjective from 2 to 7 years, and from 7 to 10 they become more objective. Meumann (52a p. 116) observes that perception at school entrance is much more subjective than in later years. This pronounced subjectivity is one of the bases of the decidedly imaginative mind of the child. The sense of judgment is undeveloped, consequently falsehoods are a natural product of the child mind. Three types of perception are characterised by Meumann. The child of 6 or 7 years has a " fantastically synthetic " perception. Analysis of an object perceived is totally lacking, but there is a peculiar focalization on some one feature of the object, which is seen as a unit and the rest of the percept is ignored. The child does not combine a number of impressions into a single picture, but attaches his attention to one phase,—hence, a house is seen as a door, or even as a keyhole, perhaps. At about 8 years the analytical type of perception dawns, where parts, relations, properties, et cetera, are observed. Later, another synthetical type appears, but characteristically different from that at about 6 years. An object is perceived, analysed into its component parts, relations of parts are judged, and all taken together are synthetised. The child at school entrance uses concrete imagery in the main, while the adult employs verbal imagery chiefly and is able to judge the relation of parts and connect all the characteristics and parts into a unified whole. Perception in the earlier stage might be termed individualistic as compared with the unified perception in the later synthetic period.

The investigation of Dr. Mateer (20a) on the establishment of conditioned reflexes in children has revealed a striking situation at about 5 years of age. In general she found the ability to establish associations increases with chronological age, but at about 5 years new potentialities open up to the child. The curve becomes less regular, and the number of trials to establish associations show much more variation. Dr. Mateer suggests that potential powers, dormant heretofore, seem to dawn now in greatly increased numbers. She has even been led to regard this as somewhat analogous to and suggestive of the differences between the pre-adolescent and the adolescent.

In her review of the study of Pohlman, Dr. Smith (65 p. 386) stated that children of 6 years frequently do not have an understanding of the words they use. Words are employed as combinations of sounds without regard for meaning and context. Dr. Tanner (67 p. 415) agrees that at 7 years, " The love of words on account of sound persists," but from this time on words gain value in meaning.

Imagination is one of the most prominent mental manifestations at this age. It is portrayed in all plays and activities.

Kirkpatrick (50 p. 155) says imagination reaches its climax in the fifth and sixth years. It is distinctly vivid but notoriously inaccurate. He believes the mental images are analysed, shifted. and recombined more readily than in the case of adults. (51 p. 189). Slaughter (64) finds that the fancies of the child go in all directions now, and perceptions are transformed into fancies and are projected. The clouds provide the best screen for this, and anything from mountains to animals may be represented. Many other objects of nature are utilized by the child for projecting his fancies. In dark and secluded places he imagines horrible things and the emotions contribute their share to the imaginal products of the mind. His imagination also carries him to the invention of secret languages. Chrisman (67 p. 415) found that these begin to be formulated as early as 5 and 6 years. Dix (33 p. 75) says children of 6 years or over are often prone to day dreaming. According to Kirkpatrick (50 p. 138) imaginary companions are frequently created as early as this period.

Imitation is manifested in most of the activities of the child. The dramatic tendency is at its height in children from 4 to 7 years. (50 p. 138). Dr. Tanner (67 p. 376) says imitation is one of the chief media of education up to the age of 7, but thereafter its importance decreases. She also states that it has been found from Stern's "Aussage Tests" that the child becomes less suggestible at a very rapid rate beginning at 7 and extending to 15 years. (67 p. 189).

Dr. Hall (42 p. 220) noted that the collecting instinct began in childhood, and continued through adolescence. In his summary of the ages at which certain articles began to be collected, it appears that many begin at about 6 years. He characterises the manifestations of this impulse before 8 years as "Crude, groping and undirected."

It is in the play of the child that we find his mental equipment in its natural order. Here imagination and imitation are exercised freely and spontaneously and we discover his natural endowment better than in any other of his activities. His waking life is not much else than play. Dr. Tanner (67 p. 498) says children under 7 years do not play games unless urged by older children or adults. Their plays up to this time are individualistic and non-competitive. After 7 such games as, "Hide and Seek," "Tag," "Prisoners Base" and "Fox and Hounds" begin to be played. In these games competition plays an increasing rôle with advancing age. Kirkpatrick also noted such a change in the plays of the child, as already indicated. In the story of the Sand Pile, Dr. Hall (42) observed that the boys did not do much organising the first summer or two, but after they passed 7 or 8 years, they began to make permanent plans as to the arrangement and organization of the play yard. Before this the interests and activities had been without much foresight and planning and they dug and built things which were soon destroyed. After this everything was planned and executed with a view of permanency. Schmidt (62 p. 17) states that in the sixth year the child becomes more interested in running, skipping, hopping, and the more violent exercises.

According to Dr. Tanner (67 p. 267) the child accepts unquestioningly what is told him regarding religion as well as other things before the age of 7. Hereafter, questions begin to be asked concerning religious matters. Quoting Dix (33 p. 129), " Children of 6 years are well awake to the voice of conscience as the whisper of God." This can be evoked, he says, by putting a few simple questions as to God and His place in the universe.

Dr. Tanner (67 p. 317) believes fears both of things seen and heard diminish slightly at the age of 6. Also, jealousy is manifested before 6 by stamping, kicking and screaming; after this age it is more apt to appear in sulking, slandering and threatening.

Some increase in the discrimination of colors and olfactory and taste perceptions are noticed here. Decroly and Degard (30 p. 107) relate from a study that at 5 years children do not discriminate many of the fundamental colors, and at 6 or 7 years only 43 per cent knew completely the series; white, black, red, green, blue and yellow, and none knew brown, gray and purple. Tracy (73 p. 17) also finds that many children at school entrance cannot discriminate or name the elementary colors. Englesperger and Ziegler (53a p.230) investigated the discrimination of colors in children at school entrance and found that 30 per cent of the boys and 28 per cent of the girls could recognize and name the primary colors. Upon presentation, white and black were named by all the children without a single error. Meumann thinks it very significant that the child learns to associate the words white and black with their respective achromatic sensations before the names of colors become associated with their chromatic sensations. As a rule girls excel boys in knowledge of colors.

Garbini (21 p. 78) found a change in olfactory perceptions at about the age of 6. The child begins to correlate the olfactory perception and its corresponding verbal expression. Furthermore, he begins to differentiate between different intensities of the same quality of odor. With the changes in the teeth and the chewing surface, there appears another striking alteration in regard to taste. In his study of foods, Bell (8) found that taste becomes mentalized at about 7 years, and that it has now a new and almost independent value. He states further, " The new importance of taste is shown by the universal tendency of children in this age to want to taste everything that is to be eaten or drunk, and many things that are not. They haunt the kitchen, the pantry, and the medicine cabinet. Their curiosity in the nature of different foods and the different methods of preparing them is increased to a remarkable degree, and taste becomes more than ever before a special organ of apperception." He notes also that along with this new tendency to taste things, children like to make all kinds of mixtures of foods and drinks, and also, demand a certain amount of raw food materials, that they may themselves exercise in preparing it. He states that this impulse begins at about 7 years and is dominant in both sexes.

In the revision of the Binet-Simon Tests, Terman (69:175) indicates that children at 6 years first distinguish perceptibly between right and left, and between morning and evening. Dr. Hall (43 p. 144ff) points out some interesting sex differences as to mental content at school entrance. He says, " Girls excel in fairy tales and boys in religious concepts. . . . More boys could repeat sentences said to them, or sing musical phrases sung to them, or sing a song, than girls. . . . The girls excel in knowledge of the parts of the body, home and family life, thunder, rainbows, in knowledge of the square, circle and triangle, but not in that of cube, sphere and pyramid. Their stories are more imaginative, while their knowledge of things outward and remote, their power to sing and articulate correctly from dictation, their acquaintance with numbers and animals, is distinctly less than that of boys. Boys seem more likely than girls to be ignorant of common things right about them."

These indications of sex differences were chiefly drawn from the investigations of others. Dr. Hall states that the most characteristic difference in his own study was that girls had knowledge of the parts of the body superior to that of boys.

This collection of facts concerning the mental status of the child at 6 years does not afford us much conclusive evidence as to transition. We note a more or less gradual and progressive development during this period. There seem to be new awakenings and nascency in some of the mental processes which heretofore were dormant. It appears that the environmental conditions during these early years determine largely the content of the mind. The social and economic standing of parents seem to contribute to the imitative propensity of children as Dr. Hall has suggested. The better off the parents, the less imitative and stiller the children. The sense of right and wrong seems to be wholly dependent on the moral training and discipline imposed by parents.

From these facts we must conclude that the mental development proceeds through this period with a much more uniform rate of progress than in the case of physiological development. Imagination and imitation are at their climax, and soon recede in importance, and hereafter the subjective predominance of all the mental processes is diminished. The plays of the child seem to pass a rather marked stage here and the recognition of others grows with age in increasing importance. Games in which others compete begin to be indulged in soon after passing this period. The ability to form associations is indicated as somewhat transitional and perception makes a characteristic change at about 7-years. One writer thinks the ability to concentrate attention over longer periods shows a little progress at school entrance and another says active attention begins to function hereafter in addition to the dominant passive attention. There seem to be significant changes in the psychical states in olfactory and gustatory perceptions. The mental processes in general seem to undergo rather gradual transformations and interests widen and multiply. There is a shift and accentuation of processes which in early childhood were in the periphery of consciousness. Numerous studies have been reported on the content of mind at school entrance. It appears that a more promising point of attack would take account of the mental attitudes and the manner of procedure in accomplishing a task. The study of Meumann on the characteristics of perception in the child is in point here. Such studies seek to discover the processes rather than the products of mind, and if we shall ever apprehend the psychical development at the various stages we shall need to concern ourselves not only with the contents of mind, but also with the processes which underlie and mould them.

III. Pathology, Morbidity, and Mortality

Pathological Conditions at Six Years.—Among the most noticeable pathological conditions at this period are those affecting the speech function. Kussmaul (15 p. 240) states that stammering may be due to inborn conditions, or to acquired faults of the use of the organs of articulation and breathing; it may be a functional disorder due to incorrect instruction or wrong practice of the use of the organs of speech, or the trouble may be purely organic. It is quite possible that all these factors may be complicated or one may occur as a single cause of incorrect vocal expression. Speech disorders are manifest throughout the period of the development of the organs involved, and the trouble is often largely due to incoordination of the motor powers essential in the speech function. Though they are prevalent at all ages in childhood, we find rather conclusive evidence that there is increase in these disturbances at the 6 year period. Many investigators seem to attribute the faults of speech to improper school conditions; at least, they are generally looked upon as a school disorder.

Clouston (44 p. 745) places stammering among the neuroses which accompany "The periods of most rapid brain growth, special sense education, and of the development of leading motor coordinations," viz. from birth to 7 years of age. Conradi (23 p. 348) states that speech disorders are regarded as normal in early childhood, but after about 6 years they are to be classed as abnormal. He gives irregularities of the teeth as a most common cause of stammering. Faulty occlusion of the jaws is also a source of difficulty. Gutzman (39 p. 275) also finds the lack or improper position of the teeth a common cause of defective articulation.

Stuttering presents still more distinct evidence of nodality at this period. Most investigators regard second dentition and puberty as periods in which children become more susceptible to stuttering. Kussmaul (52 p. 232) noticed a significant increase in the percentage of children stuttering at these periods. Baginsky (2 p. 351) designates the years from 7 to 8 and from 12 to 14 as periods in which there is temporary rise in stuttering. The statistics given by Hartwell (44 p. 746ff) also indicate a temporary rise at these periods. "The table also shows what has frequently been noted, that stuttering is most frequent at the period of second dentition, and at the onset of puberty, which are the periods when the nervous system is specially susceptible to disturbance."

Holt (46 p. 691) suggests that most people who become habitual stutterers do not begin until after 7 or 8 years. It has long been recognized that the prevalence of this trouble is much less in girls. Some hold that it is very rare that girls stutter. Perhaps the most reliable figures are reviewed by Terman (68 p. 337) in which the ratio of the predominance of this trouble in boys and girls is as 3 to 1. Most investigators would make this ratio still more discordant.

The table given by Conradi (23 p. 365) from his study of 87,440 school children corroborates the main facts already noted. His figures indicate that the tendency towards a natural cure after these periods of changing development is stronger in the case of stammering than in stuttering. His study is conclusive that there is marked increase in these disorders at second dentition and another rise at puberty. After the pubertal age the number decreases very markedly, and in the case of stammerers is very rare after about 15.

According to Kussmaul (52 p. 259) speech and audition are intimately related in their development, particularly before 5 years. He says that the origin of the trouble in deaf mutes can usually be traced back to the first 4 years of life. Deafness occurring after the age of 5 does not affect verbal imagery, even though it may debar the speech function. Heerman (48 p. 342) concluded from his study of children that those losing their sight before 5 or 6 years did not employ visual imagery in their dreams. He also believed that those who lost audition before this age became mute as well. More recently Jastrow (48 p. 342) confirmed the view that a loss of vision before 5 or 6 years incapacitates the individual to dream in visual terms. He describes the significance of this period, as follows: "The period from the fifth to the seventh year is thus indicated as a critical one. Before this age the visual center is undergoing its elementary education; its life is closely dependent upon the constant food supply of sensations; and when these are cut off by blindness, it degenerates and decays. If blindness occurs between the fifth and seventh years, the preservation of the visualising power depends on the degree of development of the individual. If the faculty is retained it is neither stable nor pronounced."

Terman (68 p. 25) sounds a note, which is gradually increasing in strength as we gain more knowledge of the development of the child. "It is now well established that the period of about six or seven years is marked by an increased frequency of nervous and digestive disturbances."

A very frequent irregularity occurs at this node in regard to the heart. This organ is very small in childhood and the arteries relatively large, as elsewhere indicated, and the growth and increasing demands on the heart often lead to fatigue and even more disastrous consequences. Christopher (22 p. 328) presents the result of his study thus, "Not infreqently children seven or eight years of age present the anomaly of dilated heart, and quite frequently evidence of cardiac incompetence, such as shortness of breath and readiness of fatigue. . . . The child of seven fatigues less readily than the child of six years, but the child of eight fatigues more readily than the child of either six or seven."

Beik (7 p. 315) has found that abnormal conditions of the tonsils frequently occur with the appearance of the first permanent molars. The tonsils inflame and enlarge and lose their power of resisting infections of micro-organisms. Tyler (74 p. 142) says curvature of the spine is very apt to be started now. Some investigators note a decided tendency towards myopic vision at about this time. The eye passes a transition in development and eye strain is very apt to occur.

These facts indicate nodality here in the development of various organs and their functioning. There is general instability and lack of completed neuro-muscular development in the case of quite a few organs. After this transition injury or apathy of the same organs might lead to quite different symptoms. With the facts of muscular development mentioned above, these additional facts seem adequate to establish that the motor coordinations of the more fundamental, and perhaps of some of the accessory types, undergo significant changes within this period.

Morbidity and Mortality.—It is well recognized that in early childhood the percentages of sickness and death are very high as compared with later life. Contagious and infectious diseases are more apt to attack the organism in the very early years. More than 90 per cent of deaths from contagious diseases occur before the age of 10. In the early years the child is making rapid adjustment to his novel environmental conditions, and in the procedure of growth the equilibrium of the different processes may not be maintained; thus, the child is rendered more susceptible to morbid conditions. It is also a commonplace that in the first few years of life, the child, if attacked by contagious diseases, as measles, mumps, whooping cough, scarlet fever, diphtheria, et cetera, is much more likely to succumb. Some of these diseases, as the first three named, occurring later in childhood, seldom cause death. In early childhood these diseases attack the very processes which subserve the vitality of the organism. Abbott (1 p. 27) says in early childhood these diseases attack the lymphatic, osseous, and serous tissues, and growth is rendered impossible or at least retarded.

Statistics show that at about 5 or 6 years there is a rather marked reduction in mortality, although there may be some increase in the morbid conditions as Terman (68 p. 25) suggests. Hartwell (45) has shown that fatality of diseases is much reduced at puberty, and it has been established that the periods of accelerated growth are accompanied, on the one hand, by an increase of acute morbid conditions, and on the other, by an immunity to fatality of diseases. More diseases may attack the organism but less deaths occur. This law would not obtain during the first few years of life when the child is making his first rapid adjustments to his novel milieu, and before some of the inner glands and tissues begin to secrete antitoxins. However, facts seem to warrant the suggestion that the physiological transition at about 6 years, the rapid growth of certain parts of the organism, and the altered function of certain organs at this time, may be found to play an important rôle in the patent diminution of mortality. Moreover, this change in development renders the organism more susceptible to disorders and morbid conditions increase.

Burgerstein (14) has made a study in several cities in Germany as to morbid conditions in childhood and finds the resistance to disease much greater after school entrance. It would appear that on entering school, where the child is subject to more contagious and infectious diseases, and often more favorable means of contracting them, the conditions would be made worse rather than ameliorated. But the resistance of the organism becomes so marked that this is more than compensated for. There seems to be a gradual increase in resistance after the first year, but the case becomes distinctly marked after about 5 or 6 years.

Rial (59) finds that the largest percentage of children succumb to measles in the second year. From 3 to 5 years there is an increase in the number of children attacked, but a much larger percentage overcome the disease. After 5 years this power of resistance becomes very marked.

Burgerstein (15 p. 258) refers to the table of Hertel on morbidity, which shows no sex difference at 6 years, but at 7 there begins a sex differentiation, particularly regarding the impoverished condition of the blood in girls. The anemic condition increases to puberty when it becomes very marked.

It is patent, then, that some changes in the organism make for better resistance of diseases at about 6 years. The morbid conditions seem to multiply, but there is a very marked decrease in deaths. This period, therefore, in a certain sense resembles that of puberty.

IV. Pedagogical and Hygienic Considerations

As far back as we have record, it seems to have been customary for school instruction to begin at the age of 5 or 6. Just why the child was taken from his home environment and placed in school at this age by the peoples of all times is not definitely known. This custom has passed down through time and has been in practice almost universally. Some radical pedagogical theorists, as Rousseau and Pestalozzi, arraigned this traditional custom and proclaimed the inappropriate environment of conventional schools for children of this age.

Their general observation of the nature of development gave them an idea of the needs and demands of the growing child, and a conviction that the conventional school environment did not satisfy them. In recent years there has been considerable discussion and some scientific investigation concerning this question. We believe the problem is now being attacked with a view to meet the needs and demands of the child, and that some insight into the requirements at the various stages of development has been gained.

Our chief concern in dealing with the growing child should be to make his growth conditions the very best possible. The principle of adapting instruction to the needs of the individual child is one of paramount importance. Let us epitomize, briefly, some of the facts already enumerated in an earlier section of this article regarding the developmental status of the child at this age. The fact of prime importance, as already indicated, is that many phases of development indicate more or less marked transitional characteristics. We found that the average boy of 6 years measures about 110 centimeters, but individual variations may range as much as 30 centimeters. Somewhat similar variation occurs as to weight. The changes in the teeth and jaws are distinctly transitional, and there is likewise wide variation; some children have not erupted all four of the first molars until after 9 years. In development of the osseous structures of the hand and wrist, we also found significant changes. Some indications of rapid development of motor coordinations are also suggested. Stuttering is common, and the development of the eyes is in a stage of adjustment. The rapid growth of the brain and the accompanying increase in size of the skull show a change in rate of growth, in which the growth both of skull and of the brain size and weight comes to an approximate standstill. A change in the range of voice is manifested, and we have differentiation of the sexes at this time in regard to several phenomena of growth for the first time.

These facts suggest a period of more or less general transition of development, wherein retardation and acceleration account for the increased width of variation. It has been shown that some children reach the stage of transition younger than others. Some children are accelerated in their development while others are retarded. Thus, a group of children of the same age may show a range of variation in development of several years. This fact makes chronological age impracticable as the basis of admitting children to school. The principle of physiological age, so strongly advocated in recent years, allows only children of a certain physiological maturity, regardless of their age, to enter, and those of retarded development are not admitted. The school environment has been indicated as a factor in prolonged retardation. In order to meet this condition, Dr. Burnham (18, 19, 20) has long advocated a health examination at school entrance. He would urge that the parents cooperate in this examination, and thus, they may give as well as receive information concerning the child and his welfare. It appears that such a procedure would avail much good both in the schools and in the homes. Many parents, ignorant of bad influences in the environment of the child, might assist in eradicating them.

Besides the possible discovery of retardation by the examination, organs and glands which function improperly or which may be defective may be discovered and remedies applied, and the child thus avoids later impairment in development. Defects of these organs, diseases to which the child may be predisposed, his peculiar habits, and much information of the individual child become important considerations for both teacher and parent in their dealing with him.

In order to further our knowledge of the individual child, Dr. Thiele (70) has made a biological study of children in Chemnitz just before school entrance. He studied 5538 children between the ages of 6 and 7 years. The basis of his study was the returns to questionnaires sent to the parents in which he inquired; the number of parents living, number of children in the family, diseases the child had had, whether the child was born prematurely, were there any epileptic or pathological ancestors, when did the child begin walking, accidents the child had experienced, defects of sense organs or of glands, of nutritive function, et cetera. Among the interesting facts revealed in his investigation were that, where there was an only child, he had had less diseases, walked earlier, was more interested in older folk and showed precocity in general. As to diseases in families of 6 or more children, the conditions were no worse than where there were only 2 or 3 in the family. It appears that such a study of the hereditary influences in the family, as tuberculosis, epilepsy, or abnormal mentality, should furnish us a good clue in our study of conditions of development, and in our grading and attempt to provide the individual child with proper training and instruction. Retardation in development may often be traced to some hereditary factor of which the above diseases may be symptoms. Such studies are indispensable in explaining retardation and irregularities of development. Measles was the most common disease, about two-thirds having had it. His study concerning the impoverishment of the blood would also prompt an improvement of health conditions.

Quirsfeld (19 p. 238) made a study of the effect of school influences on growth during the first year. Among 1014 children the increase in height the first year of school attendance was 2.5 centimeters. After this the annual increase was about 5 centimeters. Also weight during the first year in school was only .5 kilogram, while the next year the annual increment was between 1 and 2 kilograms. During the first year there was a decrease in weight of 15.87 per cent of the boys and 24.84 per cent of the girls, and a condition of standstill prevailed among 29.73 per cent of the boys and 44 per cent of the girls. Here, about 75 per cent of the girls and nearly 50 per cent of the boys show no increase in weight at all in the first school year. He also says that in 29.59 per cent of the boys and 49.05 per cent of the girls there is a decrease in muscular development during the first year of school attendance. It is patent from such facts that the child of retarded development should not enter school, at least, until he has reached the transitional stage of development. From the suggestion of Baldwin (4) and Porter (56) that mentality and physiological growth are correlated, to enter a child of retarded development means that he will probably be unable to keep up with his class in addition to his retardation period being prolonged. Thus, the health examination at school entrance becomes an important factor in grading.

An interesting study conducted in Munich from 1892-94 demonstrated the more appropriate use of vertical writing at school entrance. Both Berliner and Seggel agree that vertical writing gives a greater distance from the eye, thereby favoring this unstable stage of development. (66 p. 22). Slant writing has been charged with inducing asymmetrical development of the body and lateral curvature of the spine during the periods of rapid growth.

Seggel says the time of school entrance is a period when myopia is easily induced. When children below the height of 110 centimeters are allowed to enter school, special observation should be given to the distance of the work in order to avoid eye strain, or else the child should not enter school until his eyes have passed the transitional stage, and he is able to fuse the images of the two eyes properly and make skillful accommodation. The eye is of such importance that the greatest care should be exercised during this stage of rapid changes.

The statement that stuttering increases at school entrance, and its being characterised as a school disorder may only signify in the majority of cases that the neuro-muscular coordinations are passing a stage of transition, and have not become definite; hence, the child should not be subjected to worse conditions until he has passed this stage.

Steinhaus (66) advocates that the mental status should show certain characteristics before the child is admitted to school. His memory ideas, and the reconstruction of them, should show clearly that they are available for use, and that he is capable of employing them effectively. By applying a test here we again improve our grading system. Dr. Burnham (19) suggests that it may be impossible for us to learn with any degree of definiteness the type of imagery a child of this age uses predominantly, but we can get at the type of his learning and his comprehension of things to be learned. The Stanford revision of the Binet-Simon Tests (69) asks the child of this age to repeat a certain number of syllables, to define certain words, which are names of ordinary objects, et cetera, and his mode of response in this procedure can well give us an idea of his type of learning. Various other tests can easily be devised for this purpose. The mode of attacking a simple task is more important than the accomplishment of the task itself so far as it pertains to eligibility for school entrance.

Dr. Burnham (19 p. 227) suggests that our examination at school entrance should consist of four main factors; 1. the physiological age, 2. the psychological age, 3. the general health condition of the child, and 4. the history of morbidity of the individual child. This plan is very comprehensive and if carefully worked out and applied should provide the necessary data for us to deal judiciously with the child. No one of these factors, however in detail it may be studied, is adequate for a safe judgment of the child's status but all should be considered in our determination of his stage of physiological and psychological development.

The datum of a health and morbid examination at school entrance is an indispensable criterion for the teacher in dealing with the child, and furthermore it gives opportunity for the remedy of troubles in the period of growth when slight matters can be most easily rectified and overcome. The conditions of the teeth, nasal and pharyngeal cavities, tonsils, and the functioning of glands should be carefully looked into, and as far as possible all the factors which control and promote growth and development should be kept in normal condition. The types of diseases which the child has had in his early years, and those which seem to have an hereditary influence in his family should be carefully noted and considered. Individual records should be made and filed. Bad habits should also be noted and included in the record, and remedies applied to overcome them. These factors should all be considered in our determination of the child's fitness to enter school, and they should likewise be carefully considered in all our dealing with him after he enters.

Thus, it appears unwise and even dangerous to admit the child to school before this stage of transition has been reached and perhaps passed. To admit him before he reaches the transitional period portends an arrest in development; to admit him while he is in the stage of transition before permanent adjustment in various processes of development has been made may mean injury to certain developmental features due to overstrain at the nascent period. Some corrective measures in school instruction may make the change from the home to the school less harmful, but at present it appears proper not to allow the child in the school until he is well past the stage of transition. Dr. Burnham (20) suggests as a minimal requirement that he should have all four of the first molars, his height should be 115 centimeters and his weight 20 kilograms.

It has been suggested by various writers that the transfer from the carefree life in the home to the monotonous grind and state of repression demanded in our schools may have disastrous effects on the growing child. The schoolroom may be unhygienic, and the type of life exacted is frequently not adapted to the needs of the child. The study of Quirsfeld (19) referred to above indicates a retarding influence on growth incurred in the first year of school attendance. An important and primary step, then, when once we have an insight into the nature of growth and development and the type of life appropriate at the various stages, is the correction of the school instruction. The child should not be expected to sit stockstill for several hours, and after a short intermission return to a similar state of confinement in the afternoon. Intermissions should be more frequent, and the type of instruction should give ample opportunity for activity. The predominance of the work in these early years should be motor training, and such instruction as appeals directly to the senses. The very nature of the child, as we note his spontaneous activities, would teach us that he demands constant change and freedom of action. The greatest reform in our educational procedure, and one which is becoming more and more urgent, is the adaptation of the work to the needs of the individual child. A fuller adoption of such a policy in educational practice promises a significant advance and improvement both for the mental and somatic development of the child.

CONCLUSIONS AND SUGGESTIONS

The data presented in this study seem adequate to warrant the assumption of a general stage of transition in development at about 6 years of age. The phases of development and other conditions of the organism which indicate such transition may be briefly summarized as follows:

1. The annual increment in height from about 5 to 7 years of age is greater than in the subsequent years before puberty. The increment in individuals varies widely, indicating that the rate of growth has no regularity during these years and that various individuals reach the period of accelerated growth at different ages.
2. In weight, great irregularity occurs in the annual increment. From 5 to 7 years of age no general average can be taken, but thereafter this is possible. The annual increment varies widely and depends on the individual.
3. Very distinct changes in dentition occur at this time. The eruption of the 6 year molar marks the transition from the deciduous to the permanent teeth. The characteristics of this new type of tooth and the changes accompanying its eruption mark this period distinctly transitional regarding dentition.
4. The jaws show significant changes of development at the time of the appearance of this new type of tooth. Slight changes may occur in the anterior parts of the jaw, but in the posterior portions the alterations are quite obvious.
5. The skull has been found to grow rapidly until the age of about 6, when the rate of growth is markedly diminished. Some portions of the skull have attained their definite size at this age.
6. The face shows characteristic changes coincident with the eruption of the 6 year molars and the altered development in the posterior portions of the jaws.
7. The brain has attained its approximate size and weight at this period. The growth of this organ is very rapid up to about 6 or 7 years, after which the rate of growth is reduced very greatly.
8. In the circulatory system, the heart grows rapidly during the first 5 or 6 years, after which the rate of growth is reduced noticeably; moreover, a rise in blood pressure occurs at the age of 6.

9. The suprarenal glands, as indicated by one investigator, grow very rapidly at the 6 year period and then diminish in rate of growth until puberty.
10. Motor control and neuro-muscular coordinations show a stage of rapid development here.
11. The larynx has been found to grow much less rapidly after this period, and the range of the voice is widened somewhat.
12. The eyes show marked development in ability of binocular function, and changes indicating more facile and adept accommodation and convergence occur.
13. The variety of foods demanded by the child widens greatly at about 5 or 6 years and taste becomes "mentalized." The waste products of metabolism show some significant changes. The smallest amount of unoxidised assimilative matter in the urine is from 5 to 6 years.
14. The thorax is circular with its widest base below up to 6 or 7 years, and thereafter the widest base is at the shoulders, and the thorax becomes less circular.
15. The development of the carpal bones of the hand and wrist exhibit rapid progress at this period. Several new carpals and the lower epiphysis of the ulna appear in the 6-7 year period.
16. Some less sudden changes in mental development have been noted. Play gradually becomes less individualistic, the range of knowledge increases, the facility of establishing associations is increased, the characteristics of perception become less subjective after about 7 or 8 years, taste and olfactory perceptions make significant changes, and other processes of the mental life show more or less gradually progressive development.
17. Stammering and stuttering show marked increase at this period.
18. Nervous and digestive disturbances are increasingly prevalent at 6 and 7 years of age.
19. Cardiac incompetence and anomalies of dilated heart are apt to occur at this period. Fatigue is a very common complaint.
20. Abnormal conditions of the tonsils occur about the time of the eruption of the first permanent molars and often lead to infections by microorganisms.
21. Morbid conditions increase at this period; but the rate of mortality is distinctly lessened, thus indicating a state of increased resistance to disease.

These various points indicating transition are representative of almost all phases of development, so that it seems safe to conclude that the processes of development in general pass a stage of transition here, and are modified noticeably in passing this node.

Some interesting sex differences occur in development at this early period. It is well known that girls attain their completed growth about 2 years prior to boys, and in some phenomena of development differentiations begin early in life. The facts regarding height and weight at the 6 year period are not very decisive, however; the figures of Boas show the annual increment of height in girls a couple millimeters greater at this period. All studies indicate that girls are more precocious in development of dentition than boys. It is also stated that they attain full size of skull and brain earlier than boys. Vierordt found a manifestation of sex differentiation in pulse frequency at about this time. In motor control, girls have a larger percentage of their adult strength at 6 years than boys and show more rapid development of motor coordinations during this period. The studies by the Roentgen Ray Method show girls precocious in osseous development in general. Likewise, some sex differences were noted in mental development. Also, girls are found to be less susceptible to stuttering, the boys prevailing in a ratio of 3 to 1. A sex difference appears in the impoverishment of the blood beginning at about 7 years. In brief, these sex distinctions are points well worth noting. Just what pedagogical import such facts may have remains to be determined.

A matter of chief concern for pedagogy in any period of accelerated growth is the wide individual variations in such a period. Wide variations have been pointed out in various phases of development. Some children reach the accelerated stage of growth at a younger age than others, often decidedly outstripping those of retarded development. This fact has been indicated as the chief occasion for the adoption of physiological age as the criterion of determining the stages of development instead of the traditional chronological age standard. Furthermore, the rate of growth within this accelerated stage varies with individuals. Some pass the period more rapidly and growth is more saltatory than in others. Variability is a chief characteristic in any period of accelerated development.

As Terman has suggested, stages of rapid development render the organism more unstable in general. During rapid growth some parts may grow more than their relative proportions and others may not grow adequately; thus, the harmony of parts of the organism is easily impaired. Hence, particular care should be given the child in his stages of rapid growth and development in order that disturbances occurring may be rectified before the period of rapid growth is past. In such a stage of growth the mental attitude of the child is also apt to show a little less equanimity. These general statements are highly significant in the more rapid stage of growth at puberty, but they are sufficiently true here to warrant attention.

Because of the great variability and of the danger of retardation at this period and perhaps of increasing conditions favorable to disturbances in development, it has been suggested, that school instruction should not begin until the child is at least well into this stage of accelerated development. Physiological age, as our standard, can be applied to the individual to determine his fitness for school occupations. Health examination at school entrance can well determine the fitness of the child to enter school and give additional data of his history which are indispensable in dealing properly with him in school and at home.

Regarding hygienic care and treatment, it cannot be emhasized too strongly that the environment of the child should be adapted as far as possible to his particular stage of development. The importance of recognising the changing stages of development is gradually becoming emphasized. A delay of the accelerated period means a distinct loss to the individual. Various features of development within the stage of transition should receive careful attention. The condition of the teeth, and particularly of the first molars, which have been found most susceptible to disease and onset of microorganisms, should receive careful attention. Likewise, malocclusion of the jaws in this stage is apt to cause injuries to various organic functions. Should there be any difficulty of occlusion, the best time to ameliorate conditions is in this stage of rapid development. The eyes should be carefully guarded in their changing development so as not to incur eye strain or other ocular troubles. The changes in the heart and the facts concerning cardiac incompetence should also put the teacher and parent on guard. Precautions should be taken to avert bad conditions of the tonsils prevalent at the eruption of the first molars. If not, this may become a breeding place of diseases of the teeth, throat, and even of the entire alimentary tract. The rapid changes in motor coordinations should warn us against giving training and work at this period that involve the more delicate neuro-muscular coordinations.

Thus, the fact of transition here seems established, and this connotes a need of particular care to keep the equilibrium of the various parts in relation to one another normal; and, in growth and development of parts, precautions should be taken that all the processes of growth are normal so that the progressive stages may not be arrested in any one feature of development. It can hardly be accentuated too strongly, that at school entrance, the question of fitness to enter, and the character of the instruction as well, should be determined by the individual child and his particular needs.

BIBLIOGRAPHY

1. ABBOTT, A. C. The Hygiene of Transmissible Diseases. Philadelphia. Saunders and Co., 1901. 350p.
2. BAGINSKY, A. Handbuch der Schulhygiene. Stuttgart, Enke (Zweiter Band), 1900. 428p.
2a. BAGLEY, WM. C. The Educative Process. New York, Macmillan, 1907. 358p.
3. BALDWIN. BIRD T. Physical Growth and Physiological Age. 15th Yearbook of National Society for Study of Education. Chicago. University of Chicago Press, pp. 11 to 22
4. —— ——. Physical Growth and School Progress. U. S. Bureau of Education, Bulletin, 1914, No. 10, 215p.
5. BARTH, ERNST. Einführung in die Physiologie, Pathologie und Hygiene der menschlichen Stimme. Leipzig. 1911. 507p.
6. BEAN, R. B. The Eruption of the Teeth as a Physiological Standard for Testing Development. *Ped. Sem.*, Vol. 21. No. 4, 1914, pp. 596-614.
7. BEIK, ARTHUR K. Physiological Age and School Entrance. *Ped. Sem.*, Vol. 20, No. 3, 1913. pp. 277-321.
8. BELL, SANFORD. An Introductory Study of the Psychology of Foods. *Ped. Sem.*, March, 1904. pp. 51-90.
9. BOAS, FRANZ. Growth. Monroe's Cyclopedia of Education. Vol. 3. New York, Macmillan. pp. 187-190.
10. BOAS, F. AND WISSLER, CLARK. Statistics of Growth. Washington, Government Printing Press, 1905. 132p.
11. BOWDITCH, H. P. The Growth of Children. Report of Mass. State Board of Health. 1877, pp. 275-309. 1879, pp. 35-62. 1890, pp. 479-522.
12. —— ——. The Growth of Children. American Statistical Association. Boston, 1894, Vol. 4, pp. 65-102.
13. BRYAN, W. L. On the Development of Voluntary Motor Skill. *Amer. Jour. of Psychol.*, Vol, 5, No. 2, Nov., 1892. pp. 125-204.
14. BURGERSTEIN, L. Gesundheit und Nachwuchs. Berlin, Springer, 1914. 35p.
15. —— ——, UND NETOLITZKY, A. Handbuch der Schulhygiene. Leipzig, Barth, 1912. 548p.
16. BURK, F. From Fundamental to Accessory in the Development of the Nervous System. *Ped. Sem.*, Vol. 6, 1898, pp. 5-64.
17. —— ——. Growth of Children in Height and Weight. *Am. Jour. of Psychol.*, Vol. 9, 1898, pp. 253-326.
18. BURNHAM, W. H. A Health Examination at School Entrance. *Ped. Sem.*, Vol. 21, 1914, pp. 219-241.
19. —— ——. Health Inspection in the Schools. *Ped. Sem.*, Vol. 7, 1900, pp. 70-94.
20. —— ——. Health Examination at School Entrance. *Jour. of Amer. Med. Asso.*, Vol. 68, 1917, pp. 893-899.
20a. —— ——. Mental Hygiene and the Conditioned Reflex. *Ped. Sem.*, Vol. 24, Dec., 1917, pp. 449-488.

20b. Camerer, W. Ernährung des Kind. In Das Buch vom Kinde, Edited by Schreiber, A. Leipzig und Berlin, Teubner, 1907, pp. 48-50.
21. Chamberlain, A. F. The Child: A Study in the Evolution of Man. New York. Scribners. 1903. 495p.
22. Christopher, W. S. The Three Crises in Child Life. *Child Study Monthly.*, Vol. 3, 1897, pp. 324-335.
23. Conradi, Edward. Psychology and Pathology of Speech Development. *Ped. Sem.*, Vol. 2, 1904, pp. 328-380.
24. Crampton, C. Ward. Anatomical or Physiological Age versus Chronological Age. *Ped. Sem.*, Vol. 15, 1908, pp. 230-237.
25. —— ——. Influence of Physiological Age upon Scholarship. *Psychol. Clinic.*, Vol. 1, 1907-8, pp. 115-120.
26. —— ——. Physiological Age: A Fundamental Principle. *Amer. Phys. Ed. Rev.*, Vol. 13, 1908, pp. 144-154, 214-227, 268-283, 345-358.
27. —— ——. Pubescence: A Preliminary Report. *Amer. Anthropologist*, Vol. 6, No. 5, (1904, pp. 705-709.
28. —— ——. The Significance of Physiological Age in Education. International Congress on Hygiene and Demography, Vol. 3, 1912, pp. 224-236.
29. Cunningham, D. J. Text-book of Anatomy. New York, Wood and Co., 1909. 1427p.
30. Decroly, O. and Degard, Mlle. Observations on the Development of Color Sense. *Child Study*, Vol. 5, 1912, pp. 103-107.
31. Dick, J. Lawson. On the Incidence of Rickets in School Children. *School Hygiene*, Vol. 7, No. 2, May, 1916, pp. 81-89.
32. —— ——. The Teeth in Rickets. *School Hygiene*, Vol. 7, No. 4, 1916, pp. 147-157.
33. Dix, G. H. Child Study with Special Application to the Teaching of Religion. New York, Longmans, Green and Co., 1915. 134p.
34. Donaldson, H. H. The Growth of the Brain. New York, Scribners, 1895. 374p.
35. Dumville, Benj. Child Mind. London, Clive, University Tutorial Press, 1913. 214p.
36. Englesperger, A. und Ziegler, O. Beiträge zur Kenntniss der Physischen und Psychischen Natur des Sechsjährigen in die Schule Eintretenden Kindes. *Experimentelle Pädagogik*, Vol. 1, 1905, pp. 173-235.
37. Foster, W. L. Physiological Age as a Basis for the Classification of Pupils Entering High Schools. *Psychol. Clinic.* Vol. 4, 1910-11, pp. 83-88.
38. Gundobin, A. P. Die Besonderheiten des Kindesalters. Berlin, Allegemeine Medizinische Verlagsanstalt. 1912. 592p.
39. Gutzman, Herman. Die Störungen der Sprache von Kussmaul. Leipzig. Vogel, (Vierte Auflage). 1910. 409p.
40. —— ——. Physiologie der Stimme und Sprache. Braunschweig, Vieweg und Sohn. 1909. 208p.
41. Hall, President G. S. Adolescence. New York, Appleton. 1904. 2 Vol.
42. —— ——. Aspects of Child Life and Education. Boston, Ginn and Co. 1907. 326p.
43. —— ——. Contents of Children's Minds on Entering School. *Ped. Sem.*, Vol. 1, No. 2, June, 1891, pp. 139-173.

44. Hartwell, E. M. Report on Physical Training in Boston Schools. Boston, Rockwell and Churchill. School Document, No. 8. 1894. 151p.

45. —— ——. The Application of Laws of Physical Training to the Prevention and Cure of Stuttering. Proceedings N. E. A. 1893. pp. 739-749.

46. Holt, L. Emmett. The Diseases of Infancy and Childhood. New York, Appleton. 1899. 1117p.

47. Humphrey, G. M. On the Growth of the Jaws. Trans. Cambridge Phil. Soc., 1871, Vol. 2, pp. 1-5.

48. Jastrow, Joseph. Fact and Fable in Psychology. New York, Houghton Mifflin Co. 1900.

49. Jones, Wm. H. The Necrodontitic Hypothesis. *School Hygiene,* Vol. 7, No. 1, Feb., 1916, pp. 21-28.

50. Kirkpatrick, E. A. Fundamentals of Child Study. New York, Macmillan, 1915. 384p.

51. —— ——. The Individual in the Making. New York, Houghton Mifflin and Co., 1911. 339p.

52. Kussmaul, A. Die Störungen der Sprache. Leipzig, Vogel, 1885. 299p.

53. Landois, L. Text-book of Human Physiology. Philadelphia, Blakiston's Sons Co., 1905. 1027p.

53a. Meumann, E. Vorlesungen zur Einführung in die Experimentelle Pädagogik. Leipzig, Engelmann, 1911. 725p. Zweite Auflage.

54. Minot, Chas. S. The Problem of Age, Growth and Death. New York, Putnam and Sons, 1908. 280p.

55. Pearson, Karl. On the Relationship of Intelligence to Size and Shape of Head and to other Physical and Mental Characters. *Biometrika,* Vol. 5, 1906-7. pp.105-146.

55a. Perlin, Anna. Beitrag zur Kenntniss der Physiologischen Grenzen des Hämoglobingehaltes und der Zahl Blutkörperchen im Kindesalter. Jahrbuch für Kinderheilkunde. 1903. pp. 549-571.

56. Porter, W. T. The Growth of St. Louis Children. *Amer. Statistical Association,* 1894. Vol. 4, pp. 58-64.

57. Pryor, J. W. The Chronology and Order of Ossification of the Bones of the Human Corpus. *Bulletin of State University,* Lexington, Ky. 1908.

58. Quain. Anatomy—Edited by Shäfer, Symington and Bryce. *Osteology and Arthrology,* Vol. 4, Part 1. New York, Longmans, Green and Co. 1915. 329p.

59. Rial, D. W. The Control of Measles. M. A. Thesis (Typewritten Ms.), Clark University. 1916. 114p.

60. Rotch, T. M. Roentgen Ray Method Applied to Grading of Early Life. Proc. 4th, Cong. Amer. Sch. Hygiene Asso. Indianapolis, Indiana, Mar., 1910, pp. 184-204. Also in *Amer. Phys. Ed. Rev.,* June, 1910, pp. 396-420.

61. —— ——. The Labor and Work of Children should be Adapted to the Individual. Trans. 15th International Congress on Hygiene and Demography. Washington, Gov. Printing Office, 1913, pp. 975-984.

62. Schmidt, F. A. Unser Körper. Leipzig, Voigtländer, (Zweite Auflage). 1903. 643p.

63. Selter, H. Handbuch der Schulhygiene. Dresden, Steinkopff. 1914. 759p.

64. Slaughter, J. W. The Growth of Imagination. *Child Study,* Vol. 2, 1909, pp. 105-111.

65. SMITH, THEODATE L. Childhood. *Psychol. Bulletin*, Vol. 10, No. 10, Oct., 1913, pp. 377-397.
66. STEINHAUS, F. Welche Anforderungen sind in körperlicher und geistiger Beziehung in der Schulneuling zu stellen? Zeitschrift für Schulgesundheitspflege, Vol. 26. Beiheft, 1913, pp. 16-75.
67. TANNER, AMY E. The Child: His Thinking, Willing and Doing. New York, Rand McNally and Co., 1915. 534p.
68 TERMAN, L. M. The Hygiene of the School Child. New York, Houghton Mifflin and Co., 1914. 417p.
69. ——. The Measurement of Intelligence. Boston, Houghton Mifflin and Co., 1916. 362p.
70. THIELE, A. Versuch einer Biologie der Schulanfänger. Zeitschrift für Schulgesundheitspflege, 1913. Vol. 26, No. 6, pp. 377-386. No. 12, pp. 827-837.
71. THORNDIKE, E. L. Notes on Child Study. New York, Macmillan. (Second Edition). 1903. 181p.
72. TOPINARD, PAUL. Anthropology. London, Chapman and Hall. Phila., Lippincott. 1878.
73. TRACY, F. Psychology of Childhood. Boston, Heath and Co. 1909. 219p.
74. TYLER, JOHN M. Growth and Education. Boston and New York, Houghton Mifflin and Co., 1907. 294p.
75. WELCKER, HERMANN. Kraniologische Mittheilungen. Archives für Anthropologie. Vol. 1, 1866, pp. 89-160.
76. WEST, G. M. Growth of Body, Face and Head of Worcester School Children. *Science*, Vol. 21, No. 518, Jan., 1893, pp. 2-4.
77. ——. Growth of the Face. *Science*, Vol. 18, No. 439, July, 1891. pp. 10-11.
78. WHIPPLE, GUY M. Manual of Mental and Physical Tests. Baltimore, Warwick and York, 1910. 534p.
79. WINCH, W. H. When Should a Child Begin School? Baltimore, Warwick and York, 1911. 98p.
80. ZSIGMONDY, OTTO. Veränderungen des Zahnbogen bei der zweiten Dentition. Archives für Anatomie, 1890. pp. 367-390.

THE HEALTH HABITS OF THE TEACHER*

By Thomas A. Storey

The health habits of the teacher are notoriously bad. I am not concerned to-day with a discussion of the reason why. You know that the health habits of the teachers are bad and I know that they are bad. No explanation is needed here.

School people and philosophers interested in educational progress have proclaimed for more than two thousand years that health is of fundamental importance to the achievement of the best that is possible in all human effort. But the average teacher and the average philosopher even to-day, like the average human in general, takes but little trouble to inform himself concerning the laws of health, and takes less trouble to practice these laws.

Because of their bad health habits, teachers are sick more than they ought to be, and on the average die younger than they should.

We teachers are more commonly accustomed to spend time and attention in the examination and care of plants and pets—a rose bush or a canary bird—than we are to spend time and attention in the examination and care of our bodies and their important organs.

We are more regularly concerned over the living things—the insects, scales and other parasites—that destroy the chestnut tree, the spruce, or the potato plant, than we are in the practice of health habits that protect our own bodies from the living and the inanimate things that injure human health.

We may look after the daily lives of our grain fields, our orchards, our farm stock, or our household pets, but we teachers, like most other people, are very likely to form our own daily habits without any particular thought or definite plan. We eat our meals in a hurry, we give our dyspeptic forming dispositions full freedom, we don't exercise unless we have to, we have forgotten how to play, and we purchase our recreation and rest at a movie show where we may be entertained with the least amount of effort on our part.

Truly these are health habits of which no one can be proud.

Two hundred years ago, the average age at death among the civilized nations of the world was twenty years. To-day the average duration of life is forty years. Life expectancy has been doubled since the eighteenth century.

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* An address prepared for presentation before the Normal Training School Section of the State Teachers' Association, held at Syracuse, November 27, 1917.

We live longer and are sick less often nowadays because individuals practice better health habits, and communities practice better health habits. Wherever groups of human beings have come together, as they do in our modern communities, and spend money wisely and sufficiently and habitually for clean safe food, for clean water, for the effective disposal of sewage, for the provision of parks and playgrounds, for the medical inspection and care of school children, and for those other health protecting agencies that are essential to the practice of wise community health habits, the result has been a reduction in the amount of sickness and a reduction in the occurrence of postponable death.

And in like manner, the individual who practices wise health habits, protects his health and prolongs his life. The human being who practices intelligent habits of bodily care and bodily repair; reasonable habits of protection against the agents that injure the body and destroy health; and practices wise habits of nourishment, excretion, exercise, recreation and rest, is bound to live longer, live happier and live more usefully. And so my advice to you to-day, and I am here, as I understand it, for the purpose of giving you some general advice concerning your health habits, will be submitted to you along these lines.

First, I recommend that you acquire the habit of inquiring with some care into the best literature we have relating to health. Unfortunately, there is an enormous amount of worthless literature on this subject, and it is not easy for us to decide upon the value of many of the books, pamphlets and other publications that are found everywhere. Furthermore, we are forced to revise our judgment as to what is true in the various sciences that are fundamental to hygiene, so that some things we accept to-day we are obliged to discard to-morrow. But in spite of all this, we are in possession of a vast amount of very important, firmly established scientific data upon which we can safely base our laws of health. Among the most easily available sources of information concerning the care of the body and the facts of health are the publications of our various State and Municipal Boards of Health. I am sure that if you communicate with the State Commissioner of Health in Albany, he will send you some very useful literature bearing upon health problems. The Board of Health of New York City, and the Board of Health of Buffalo, issue bulletins and pamphlets that are of great value along these lines.

The United States Public Health Service in Washington publishes a weekly bulletin and issues other literature which I have found frequently contains important and useful practical articles applicable to the everyday life of the average citizen.

The Journal of the Outdoor Life, published at 289 Fourth avenue, New York City, is well worth reading.

Perhaps the best source, and the source from which the most complete information may be secured along the lines we are discussing, is the Life Extension Institute, 25 West 45th street, New York City. This organization issues letters and folders bearing upon the whole range of individual health. I have found these publications very useful and very practical.

My second suggestion is that you establish wise habits for the care and repair of your body. I am convinced that a great deal of sickness and a great amount of postponable deaths would be avoided if men and women would secure regular health examinations once or twice a year. You would be healthier, you would live longer, you would be more useful if you were to secure such examinations and follow the advice given you at such examinations. Care should be exercised to select a reliable physician and a dependable dentist. All physicians are not reliable and all dentists are not dependable. They are no better—and no worse—than school teachers. You must make your selection with care. But having selected your examiner and having secured your examination, you should follow the advice given. Examinations should be repeated once or twice a year.

This examination should be a complete one. Do not be satisfied with the woman or man physician who examines your heart through your clothing. Do not be satisfied with an examination that does not secure for your examining physician an opportunity to observe and examine with intimate care all the important organs of the body; the condition of your blood; the state of your urine; the nature of any longstanding irritations or sores or abnormal growths; or the nature of any unusual excretions or discharges that may be present.

One woman in every seven, past the age of thirty-five, dies of cancer. This terrible ratio would be very largely reduced if the chronic irritations, old sores, or unusual growths, from which cancer develops, were discovered and taken care of before the cancerous development has been given opportunity to establish itself. The sick rate and the death rate from tuberculosis of various kinds is appalling. This disease would be less frequent and its fatal termination less common if our lungs were given careful expert examinations every six months and we were wise enough to follow the advice given us.

Nervous diseases from defective vision, a great variety of troubles depending upon decayed teeth and root abscesses, heart troubles, kidney troubles, digestive troubles, and a number of other organic degenerations and ailments, would be reduced if human beings were in the habit of securing for themselves expert health examinations and consequent expert advice at regular and appropriate intervals.

In the third place, I would urge you to practice reasonable habits of self-protection against the agents that cause disease and destroy health. I am thinking of the importance of safety first habits in relation to accidents from mechanical, chemical and physical sources. Something like seventy-five thousand people in the United States are killed each year through preventable accidents, and perhaps a million people injured, but not fatally, because of accidents from physical, mechanical or chemical sources, which could be avoided.

Then I am thinking of the whole range of disease-causing organisms that destroy health and destroy life. These are the organisms that cause what we call our 'preventable diseases.'

There are approximately three million people in these United States sick at the present moment with preventable disease. Three million people, some of them losing time from their work, many of them in pain, many of them losing income, all of them causing anxiety, apprehension and fear, and all of them suffering injury from living organisms which may be avoided.

These living things that destroy human life, that injure human health, are carried from one human being to another, either through our carelessness with our respiratory excretions or fecal excretions or our genito-urinary excretions; or by means of blood-sucking insects or insects that breed and feed in human excretions. They may be carried by infected animals which associate with us too intimately or supply us with food.

Our habits of health protection against such agents and carriers of disease—such destroyers of health—must include habits of personal cleanliness, provision for clean food and clean water and clean contacts with other human beings. People should always wash their hands before they eat; they should always wash their hands after the toilet; they should never finger their eyes or care for open wounds without first washing the hands.

We all understand that spitting is a bad habit, but many of us have yet to learn that coughing and sneezing are equally bad habits, unless we cough or sneeze into a handkerchief or a rag and thus prevent the distribution of the disease germs contained in our respiratory excretions.

We should protect our sick from blood-sucking insects and we should keep such insects away from human sewage, so that the insect carriers of disease may not be given an opportunity to spread infection.

In these several ways I can only hastily point out to you the lines along which habits may be developed for the protection of the body and its organs against the agents and carriers of disease.

And finally, I would urge you to practice wise habits for the satisfaction of your bodily needs. I have in mind your habits of nourishment, excretion, exercise, recreation and rest.

I need hardly advise you as to the importance of supplying yourselves with nourishing food, but I am certain that many of you will profit if you follow my advice to cultivate the habit of being cheerful at mealtime. A man or a woman who eats with a grouch is bound to have indigestion. If you go to your meals under the influence of anger, discontent, apprehension, worry, or fear, you will pay the penalty with dyspepsia. Meals should be eaten slowly, food should be well chewed, and the table situation should be cheerful and happy. We have ample scientific evidence to prove the accuracy of these statements.

A great deal of poor health is due to a lack of attention to the bodily excretions. One should drink an average of six or eight glasses of water a day in order to assist the kidneys in their excretory functions. These organs are the most important organs of excretions we possess.

One of the commonest of our bad health habits is our neglect of the fecal excretions. Constipation is responsible for a vast amount of poor health and serious disease. A mother who teaches her child the habit of regular adequate dejection everyday is performing a service which may have an unsuspected but powerful influence upon the longer life and greater happiness of the child. The man or woman who neglects the cultivation of habitual regularity of fecal excretion inevitably pays a health penalty sooner or later. My insistent and urgent advice to you is to establish the habit of full complete evacuation of the bowels every day.

Exercise, recreation and play are just as essential to a whole and complete life as food, air or water. If you want to realize your full health possibilities, if you want to avoid poor health, if you wish to escape disease, you must have adequate exercise, adequate recreation, and adequate play. The man or woman who spends the day in physical inactivity and fails to turn out a moment of happiness or a flash of joy, cannot escape nervous disease, premature old age and an early discard into the scrap heap. In our early and middle lives, the daily exercise should be enough to produce some sweating and invite a cool or cold bath. The best time to exercise and play, if the play is vigorous, is before meals, rather than immediately afterward. Quiet, cheerful play and recreation may be undertaken at any time.

The average human being seems to need about eight hours' sleep in each twenty-four. Some people do very well on less, while others seem to be in absolute need of a greater amount of rest. Those of you who sleep too little must pay the penalty. The fatigue of one day cannot be removed in time to enable you to meet the demands of the next day if you do not secure sufficient rest. Rest is nature's cure for fatigue.

My advice to you then is—first: establish reasonable habits of inquiry into the facts that bear upon the care of the body and the conservation of health. Second: select your health examiners with care and go to them regularly once or twice a year for a thorough health examination. Third: establish wise habits for your protection against the mechanical, physical, chemical and living agents that injure health and destroy life; and guard against the insect and other carriers of disease. And, finally, establish for yourself wise habits for the purpose of satisfying your physiological needs;—habits of nourishment, habits of excretion, habits of exercise, rest, recreation and sleep.

Don't remain ignorant of the simple, fundamental laws of human health. Inform yourself intelligently.

Don't be ignorant of your own body and its health needs. Be sane about it. Don't worry.

Don't neglect the defense of your health—avoid the agents that injure health and the agents that carry disease.

Don't eat in a hurry; don't eat with a grouch; take a few minutes of cheerful leisure after your meals.

Don't neglect your excretions.

Don't lose your habits of exercise, of play and of active, happy recreation. If you have forgotten how, learn again.

Don't sacrifice your rest.

One thing more: Your health problems are very intimately dependent upon the health habits of the community of which you are a part. No matter how wisely and carefully you devise your own policy of personal health control, you cannot succeed in your plans for the acquisition and conservation of your own individual health unless the health standards of the community of which you are a part are high. If your community sewage is bad, if your community water supply is polluted, if there are breeding places for malarial mosquitoes in your neighborhood, if there is no supervision over the purity of milk that is brought to your door, or the cleanliness of the meat that your butcher brings you, if you are not protected by quarantine against people sick with infectious disease, your own individual health habits will not save you from the bad habits of your community.

Therefore, it is incumbent upon you not only to practice wise individual health habits yourself but to use your influence in every way you reasonably can to produce wise habits of health in your community. Be ready to vote the right way. Be ready to spend money for the purpose of buying health in your community. Be ready to spend money to teach your school children how to live, and be ready to care for them whatever the cost, so that they may reach maturity with all the health and all the vigor which they deserve.

A combination of wise individual health habits and wise community health habits must inevitably lead to lower death rates, lower morbidity rates and to greater community vigor and health.

APPRENTICESHIP AND ITS RELATION TO INDUSTRIAL EDUCATION

By Paul H. Douglas, Reed College

The most important educational movement during the past decade has been perhaps that toward industrial education. The cause lies in the failure of the workshop to provide proper industrial training for its young employees. In order to understand the present educational situation, therefore, it is imperative to examine the industrial ascendency and the roots from which it has grown, namely, the old system of apprenticeship that formerly provided broad training for the young workers of this country.

Apprenticeship is essentially a combination of education and industry. It is a process of learning by doing, under which a minor is taught the art of a trade by one who is at the moment engaged in it; the minor paying either in whole or in part for this instruction by the work done on objects destined for the master's consumption or sale.

This is a sufficient definition of an institution that was the chief means of trade education until the advent of the machine era. The apprentice differs from the ordinary child laborer in that he not only works for his master but receives instruction in his trade. Apprenticeship ceases when child labor degenerates from education to routine. Since now the shop no longer trains the child worker, other agencies must be created to assume the responsibility.

Apprenticeship can exist, either with or without a legal indenture. In its essence it is a contractual relationship between boy and master, involving an exchange of work for education. The indenture is merely the legal instrument bearing witness to this relationship. The contract itself may be held binding in the absence of any written agreement whatsoever. For instance, a Connecticut court has held that a boy who lived to the age of twenty-one with a mechanic, learning the trade under parole agreement, was an apprentice though there were no articles of indenture existing between the two.[1] Other decisions have been made supporting this view.[2] In fact, many of the firms that now have apprenticeship systems do not have formal written indentures binding the two parties, but allow a continuance of the relation upon the pleasure of both. It goes without saying, however, that though the indenture is not synonymous with apprenticeship, it is very valuable as a means of giving needed fixity and definiteness to a relation that might otherwise become too lax.

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[1] Huntington v. Oxford, 4 Day, 189 (1810).

[2] State v. Jones, 16 Fla. 306. See Niles Register, vol. 59, p. 336 (1840), where record is made of a similar decision by which a boy was sent back to his master, though no written agreement existed.

Apprenticeship originated far earlier than is commonly supposed. The popular belief is that it had its inception in the handicrafts of the medieval town, crystallising in the regulations of the craft gilds. No writer upon economic history, in fact, has placed its beginnings further back than this period. Adam Smith declared: "Apprenticeships were altogether unknown to the ancients. I know of no Latin or Greek word (I might venture, I believe, to assert that there is none) which expresses the idea we annex to the word, Apprentice."[3] This statement by Smith has been freely accepted by writers upon economic history and industrial education. The Encyclopedia Brittanica says: "So far as it can be seen, it (apprenticeship) arose in the middle ages, and formed an integral part of the system of trade gilds and corporations."[4] Recent works upon the subject contain similar statements. One declares that "The modern apprenticeship system has its origin in the medieval handicraft work;[5] another that "the apprenticeship system took its rise in medieval handicraft work."[6] Many similar citations could be given.[7]

As a matter of fact the history of apprenticeship does not stop here. Traces of it are found in the very dawn of civilization. The Babylonian Code of Hammurabai (2100 B. C.) recognizes and regulates apprenticeship in the following terms: "If an artizan take a son for adoption and teach him his handicraft, one may not bring claim against him. If he do not teach his handicraft, that adopted son may return to his father's house."[8] Aside from proving once more that there is nothing new under the sun, this voice from the past is significant in several respects. In the first place, the fact

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See also H. G. Wood, "A Treatise on the Law of Master and Servant," p. 52: "When the parties to a contract are bound thereby, one to teach and the other to learn and serve at a certain trade or business, it is a quasi contract of apprenticeship, whether in writing or by parole."

[3] Smith: "The Wealth of Nations" (Cannan edit.), vol. 1, p. 124.

[4] 1910 Edition, vol. 2, p. 229.

[5] J. L. Taylor: "A Handbook of Vocational Education," pp. 138-139.

[6] Bulletin 19, U. S. Bureau of Education, 1913.

[7] Among these may be cited: Labatt's "Master and Servant," vol. 6, p. 6384.

[8] The Code of Hammurabai (Harper trans.), p. 74, rules 188-189.

of codification proves that apprenticeship was even then in an advanced state of development and had probably already existed for a considerable period of time. Secondly, it appears that the status of master and apprentice was that of father and son, a blood fiction being created. The term of apprenticeship, furthermore, lasted apparently for life. The apprentice leaves his father's house to go to that of the master; if the master teaches him, he stays. Finally, there is indication of state supervision over the relations of master and apprentice, since the master is required to teach the apprentice his trade without the right to exploit him as boy labor. Among the Greeks, the existence of apprenticeship is witnessed to by references of several writers. Plato plainly refers to it in "The Republic."[9] Xenophon says it is "Just as necessary as when a man puts his son out to apprenticeship to be trained that a contract should be made concerning what the son should know."[10] Thus, the existence of apprenticeship is not only established, but there is evidence that it was regulated by agreements between the master and the father of the apprentice. Modern classical scholars have indeed accepted apprenticeship as an essential factor in the economic life of Athens.[11]

Apprenticeship was furthermore present under the Roman Empire. Lucian mentions that he was apprenticed to his uncle to learn sculpturing, but that he broke his contract and ran away.[12] Professor Westermann has recently translated several indentures that give an idea of the conditions of apprenticeship in Roman Egypt.[13] According to these contracts, the artizan gave trade instruction, plus other considerations, to the apprentice in return for the apprentice's labor.

Some of the masters practised the trades of weaving, shorthand writing, flute-playing, hairdressing, and nailsmithing. The time of service for these trades varied greatly. In the weaving trade, the indentures provided for a term of from one to five years, with indications that a three-year period was the one most commonly required. A boy apprenticed to a flute player had to pay a money subsidy to the master, probably because his labor would be worthless. In weaving, on the other hand, it was the master who paid the apprentice. A compensation for clothing was allowed, and money wages not only were paid to the guardian or parent during a part of the third year of service but also for such period thereafter as the apprentice might serve. The wages were progressively graduated according to the length of the contract. The apprentice, furthermore, does not appear to have lived with the master, but to have boarded at home; in return for which the master made an additional money allowance to the parent of the boy.

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[9] Plato, "The Republic," book IV, Spens. translates, "His sons and those others whom he instructs;" Jowett translates, "His sons and apprentices." Jowett, Dialogues of Plato, vol. III, p. 109, The word translated is—*δημιουργούς* or demiourgos.

[10] Xenophon: De Re Equestri, 2.2.

[11] See for example Zimmern: "The Greek Commonwealth," especially the chapter on "City Economics: Craftsmen and Workmen," pp. 255-276; also L. F. Anderson, "Some Facts Regarding Vocational Training Among the Ancient Greeks and Romans," *School Review*, vol. 20, pp. 191-201.

[12] Lucian: The Dream, Dakyn's trans.

[13] W. L. Westermann: Classical Philology, vol. XI (1914), pp. 295-315; also an article by the same author, "Vocational Training in Antiquity" in the *School Review*, vol. 22, pp. 601-610.

It is apparent that there was no fixed term of service or rate of wages, these matters being settled by individual contract. The state's interest was confined to levying taxes upon apprentices and to inflicting fines in cases of broken contracts. All the apprenticeship regulations, moreover, were confined to the provisions of the common law. None of the codes made specific inclusion of them.[14] It is undoubtedly this absence from formal Roman law that has led jurists and economic historians to deny the very existence of the apprenticeship institution.

That the institution is of ancient origin, should not, however, excite much surprise, for it is obviously the normal correlative of handicraft labor. Whenever industry has developed beyond the family as a self-sufficing entity, separate trades arise from which the artizan must derive the whole or a part of his living. The growth of the industry must in many cases entail more work than can be done by the sons alone. Other boys must be taught the trade, not only to insure skilled workmen, but also in some cases to provide continuity in its management. The inevitable result is apprenticeship.

The system of apprenticeships has been used to prepare men for all forms of industrial and professional work rather than for the manual crafts alone.[15] It cannot be repeated too often that apprenticeship is basically a process of learning by doing.[16] It is a higher form of the trial-and-error process, containing a large amount of imitative motion. As such, it quite naturally antedates all theoretical instruction.

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[14] Professor Westermann states that the codes of Justinian and Theodosius seem to indicate a continuation of the apprenticeship system with governmental regulation for the purposes of taxation together with greater rigidity in the heredity principle of choosing a trade.

[15] Among the Greeks there was no distinction between what we now designate as trades, crafts, arts, and professions. All alike were given the same name: Techne.

[16] The educational nature of apprenticeship is seen from the French and German equivalents of the term. The French word is apprentis-

The avenue of entrance to all professions formerly lay through apprenticeship. Until recent years lawyers were almost predominantly trained in law offices by practising attorneys.[17] Even to-day, despite the multiplicity of law schools, many attorneys are educated by this purely "prentice-like" practise.[18] Dentists and doctors have in the past been trained by similar methods. Indeed, as Mr. Flexner points out, English medical schools are but an outgrowth of the pooling of apprentices whom individual doctors have taken with them in their rounds through the hospitals.[19]

As medieval universities were controlled either by gilds of students or by gilds of teachers, graduation from the student ranks meant at first only entrance into the rank of teacher. Just as the medieval silversmiths, coopers, and other craftsmen were compelled to produce a "masterpiece" as evidence that they had successfully completed their apprenticeship and were qualified to become full-fledged journeymen, so too was the student compelled to produce his original piece of work for graduation. The dissertation of the modern doctor of philosophy is a vestigial remain of this institution.

Chivalry itself was but a species of handicraft. A boy having served seven years as page and seven years as squire was then admitted with attendant ceremony to the rank of knight. These steps were perfectly analogous to the stages of apprentice, journeyman, and master craftsman, through which the artizan passed.

In recent times pedagogy has also been taught by the method of apprenticeship. In 1846 the pupil-teacher system was introduced into the London schools to succeed the Lancastrian or monitorial system. Boys and girls were apprenticed to the head teacher, assisted him in his work; received instruction (which was generally given at the breakfast hour) and were paid a small but increasing wage for their labor. This practice was plainly nothing but apprenticeship. The teacher-apprentices were supposed to be not less than thirteen years of age, but in many cases they were still younger. The London County Council in 1875, wishing to reform the situation, stipulated that no pupil-teachers would be accepted who were less than fourteen. In 1869 there were two apprentices for every

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sage; the German, lehrzeit, springing respectively from the stems, apprendre and lehren, to learn.

[17] See Redlich, "The Case Method in American Law Schools" (Carnegie Foundation), p. 7.

[18] Idem, p. 7.

[19] *The Atlantic Monthly,* Oct. 1915, p. 528.

teacher. This indicates that the teaching profession was not only poorly manned, but that apprentices could not be sure of final opportunity to serve as full-fledged teachers. Even in London to-day the art of teaching is imparted in this fashion. The relative number of apprentices has, however, decreased. In 1904 the ratio was one apprentice to every four masters, while the instruction formerly given by individual masters is instead given in normal schools.[20]

Though apprenticeship has been the generic form of education for all these professions, the old imitative, empirical method of education has been largely or wholly replaced by school training. Whenever a trade, craft, or profession has developed to such a stage that general principles and scientific causation can be abstracted from personal contact, then apprenticeship as the sole or chief method of training for that occupation declines. That which was an art becomes a science with more or less fixed rules and a generalized method of procedure. In our day, we have seen schools of finance and administration invade the art of business management, promising to revolutionize the functions of the entrepreneur, and make business a science.

Will this movement from the system of apprenticeship to school training, which has been so characteristic of the professions, take place in the manual arts as well? Will bricklaying and carpentry be taught in the schools in the future as medicine and law are now, rather than on the job? This question is indeed an open one, but it is extremely doubtful if the school can ever replace the shop as the chief method of training manual workers. Even in the professions, abstract instruction alone has been found inadequate; young lawyers must become clerks in offices, doctors must serve as internes in hospitals. In industrial pursuits the case for shop training appears even stronger. The content of the various trades cannot easily be given elsewhere than in the industry itself.

Another function of apprenticeship is the development of character and good citizenship. Originally it was a preparation for life, not a preparation for technical pursuits alone[21] The English gilds formerly acted as the moral and educational supervisors of the apprentice—among other things, in some cases requiring church attendance—and this theory of the social nature of apprenticeship existed long after the gild form of organization decayed. Peel's child labor law of 1802 was entitled, "An Act for the preservation of the health and morals of the Apprentices and others employed in cotton and other mills and cotton and other factories."[22] This law stipulated that educational training should be given every day with religious instruction "one hour every Sunday."

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[20] Final report, London School Board, 1870-1904, pp. 138-146.

[21] See R. A. Bray's view of the essence of apprenticeship,—"Originally the term apprenticeship was employed to signify not merely the practical training in the mysteries of a trade, but also that wider training of character and intelligence on which depends the real efficiency of the craftsman." "Boy Labour & Apprenticeship," p. 1.

The apprenticeship regulations of the colonies furnish ample proof that this conception of apprenticeship held in America as well as in England. The statutes of nearly all the colonies provided that the apprentice should be taught to read and write, should be given biblical instruction (Massachusetts compelling church attendance) and that the master must be a moral man. Should the master violate any of these provisions, the apprentice was to be freed from his contract. The system was designed, as far as the isolated life of the times permitted, to prepare the apprentice for society as well as for his trade. Nor should it be forgotten that the state assumed supervision over the apprentice until he reached the age of twenty-one, in some cases, twenty-four. At the present time the states, with few exceptions, disclaimed any responsibility for the child over fourteen. In our far more complex life with its many dangers to adolescence, we are turning children loose from seven to ten years earlier than in colonial times.

Apprenticeship has frequently resulted in a semi-servile status which contrasts curiously with its protective features. The relation of the apprentice is at best a dependent one, and in primitive states of society it may readily take on some of the aspects of slavery. Among many of the Southern colonies, notably Virginia and South Carolina, the same laws were made applicable to negro slaves and to white apprentices.[23] A study of the methods by which the various states manumitted the slaves within their jurisdiction, shows that apprenticeship was a half-way stage between slavery and complete freedom. In the slow social evolution which the Pennsylvania negro experienced, he passed through the state of apprenticeship on his way to freedom. The abolition act of 1780 commuted the term of servitude to a term of apprenticeship under the old masters of the former slaves.[24] New Jersey and Illinois followed a similar plan.[25]

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[22] 42 Geo. III, c. 87.

[23] See Henning, "Virginia Statutes," vol. 3, pp. 446-47: "An Act Concerning Servants and Slaves."

[24] See E. R. Turner: "The Negro in Pennsylvania," pp. 89-108.

[25] The New Jersey act of 1846 simply substituted apprenticeship for slavery. See H. S. Cooley, "A Study of Slavery in New Jersey," pp. 28-31. The census of 1850 enumerates several hundred New Jersey

A parallel proposal was made by the Prussian landowners when the "hereditary subjection" was about to be removed. Cuba, in freeing her slaves, pursued an identical policy.[26] When England freed her slaves in 1831, the colonial government re-committed the freedmen in the West Indies to a term of apprenticeship; owners being metamorphosized into masters. The evils that followed the creation of this new status were every whit as bad as those of the previous era. Men and women were flogged to death, and the barbarous cruelties that were practised show that in the West Indies, at least, the rhinoceros whip and other appurtenances of slave discipline were as active and as powerful under apprenticeship as under slavery.[27]

It is very interesting to note that Abraham Lincoln, during his first term in Congress, introduced a bill for the freeing of the slaves in the District of Columbia, that provided a temporary system of apprenticeship for them.[28] It was indeed the enactment of apprenticeship codes by some of the southern states after the Civil War[29] (codes which provided for a more or less permanent semi-servile status of the newly-freed negro) that was the immediate cause of the harsh measures of reprisal undertaken by the North upon the South. The leaders of the radical northern movement charged that slavery was being again set up in the South under a different guise.[30] Whether many of these nominal "apprentices" received the training necessary to constitute *bona fide* apprenticeship is, of course, extremely doubtful. The legal fiction of apprenticeship was however maintained.

The reasons for this curious use of apprenticeship are simple. It is dangerous for the slave to be suddenly transposed from slavery to freedom. The freedman is disposed to idle away his time. This means the disorganization of the working force of the former master. The former owners moreover feel that they are entitled to compensation. If

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blacks who were legally "apprentices." For the process in Illinois see N. D. Harris. "The History of Negro Servitude in Illinois," pp. 6-103.

[26] H. H. S. Aimes, "Transition from Slave to Free Labor in Cuba," *Yale Review*, vol. XV, pp. 68-84.

[27] William Bevan, "Operation of the Apprenticeship System of the British Colonies" (published in 1837), pp. 35, ff, gives a striking account of the system.

[28] Strunsky: "Abraham Lincoln," p. 68.

[29] Notably Alabama, Louisiana, and Mississippi. For a southern account, showing the alleged necessity for a more permanent labor force, see Hilary A. Herbert's "Why the Solid South?"

[30] See, for instance, James G. Blaine's "Twenty Years in Congress," vol. 2, pp. 94-103.

money is denied them, they claim further service from their former slaves.

The legal theories of apprenticeship have naturally changed with the successive forms of its constitution. In Babylon, as we saw, the relation of master and apprentice was that of father and son—apparently a relation of permanence. All the potential harshness of the *patria potestas* (to use an anachronism) accompanied this relationship. By the time of Roman Egypt, apprenticeship had developed into a contractual state of fixed stipulations under which the apprentice received a money reward as well as instruction. He became, in a word, a wage-earner. This change of status weakened the concept of filiality. In the Middle Ages apprenticeship became a matter for corporate control upon the part of the gilds. The master had now become the temporary guardian, not the parent, of the apprentice. But though the apprentice is not the property of the master, his term of service is. The unexpired serving time of the apprentice is an economic asset of the master and could, under certain conditions, be sold or bequeathed. This constitutes property in time if not in persons.

With the coming of the machine era, the length of the period of service was shortened. Industry did not now require protracted service on the part of any individual. Master and apprentice now stand in the capacity of friends who can terminate their relation at pleasure. Two main tendencies appear in this development: (1) The movement from a personal to an impersonal basis, (2) the decrease in length of service, beginning with a lifetime and ending in some cases with but a few months.

The problems presented by the decadence of apprenticeship are not peculiar to America alone. Great Britain has seen child labor robbed of its former educative qualities, and become largely routine drudgery. France, after abolishing the gilds in 1791 felt the need of skilled training, and some of the best analytical studies of modern industry have resulted from her knowledge of that need.[31] Germany as we all know, has met the problem better than any other nation. She has accomplished this through her perpetuation of the gilds as the supervisors of trade education and through her system of compulsory attendance in continuation schools. Italy and Switzerland have experienced the same difficulty. Industrially backward countries, such as Austria[32] and countries newly inducted into the machine process, like Japan, face parallel situations.

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[31] Some of the more important recent studies are: Charles Berteaux: "La Crise de l' Apprentissage en France" (1909) Gustav Dron, "Proposition de loi sur l' organization de l' apprentissage, par les cours professional" (1911) Constant Verlot, "Rapport fait au nom de la commission du commerce et de l' industrie sur le projet et les propositions de lois relatif a l' enseignement technique industrial et commercial." (1912.) Also two governmental studies, "Rapport de l' apprentissage dans l' industrie de l' horlogerie" and "L' Apprentissage industriel."

Wherever the old hand process has given way to machinery, wherever the division of labor has been greatly extended, there the old system of apprenticeship has broken down. With it the training of the boy in industry, both for the industry and for life itself, becomes more and more difficult. The problem of the future is to devise a system which will modernize the good features of the former system and add to them merits which it did not formerly possess.

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[32] See August Liwehr, "Die Lehrlingsfrage in der Grossindustrie," Oesterreichische Rundschau, vol. 36, pp. 199-201. (1913.)

NEW EDUCATIONAL DUTIES OF OUR TIME*

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Translated by Helen M. Downey

The treatment of the world-war in school presses upon the pedagogue as an inevitable obligation. We must not only assist youth to a right attitude toward all the staggering daily events, and show it how it may acquire therefrom the proper subjective advantage, but must utilize, as a more deeply penetrating influence on character and inner life, the serious and susceptible mood which is generated by all the stirring impressions.

In this connection one can distinguish three main pedagogical tasks in the treatment of the war-theme: first, exposition of the ethical values of the war; second, the obviation of the dangers which may arise for youth from the various impressions from the theater of war; third, the direction of the attention of the young generation beyond the world-war effects, which are separating nations, to the inevitable reconciliation of the peoples and the moral tasks arising therefrom.

As for the first-named task, the most obvious ethical value of the war lies, of course, in the stimulation of *public spirit* and of *love for the Fatherland* by the inspiring sight of tremendous, concerted action in which the superindividual life of the nation, borne by the heroic readiness for sacrifice on the part of millions of people, becomes a phenomenon which sweeps one along and drags the individual irresistibly from his isolation. The *social-pedagogical* task of setting forth in full this anti-egoistic effect of the war is, of course, the simplest because it is supported most directly by the elementary impressions of the day. It has rightly been proposed, from the pedagogical side, to arrange *"war-hours"* (the last school-hour on Saturday) in order to create a point of concentration for all such national-pedagogical effects; the older classes are to be assembled at that time and the individual pupils can give a survey of war-events; others make reports on the special heroic deeds which have been announced in the newspapers or in letters from the front; the younger children may quote poems; finally the teacher is to select some gripping theme from the events of the week. It is doubtless right that in these days the school should lift the feelings of the individual from isolation and create for all individual thoughts and feelings an ordered, collective expression in which the individual feels and is kindled with enthusiasm, not as an individual, but as a nation and "chorus." The task of the teacher, or of individual pupils who are thoroughly prepared for it, would then be to deepen the newly-awakened historical and ethnological interest by accurate, and condensed accounts, perhaps by orientating surveys of England's colonial or economic history, of the history of Alsace, of the Baltic provinces, of the Polish kingdom, of Turkey, of the Belgian Congo State, etc. or of the peoples of Austria and the Balkan States. A report by the teacher on Islam in Africa and Asia would also arouse lively interest just now.

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A more personal effect and one striking at the essence of character can be exercised if the teacher turns from the national, collective action to its individual supporters and from the aspect of the heroism of the individual tries to draw not only moral stimuli, but also quite concrete suggestions for imitation in school and home.

However one judges the total balance of the war, and whether or not one considers its destructive, greater than its constructive effects,—the fact remains indisputable that war has always formerly been regarded as a high-school of the heroic ideal; it has vigorously maintained the *consciousness of unconditional obligations* and every kind of *disciplinary severity* as against softness and egoism—and this very imposing object-lesson which proceeds from the military heroism of sacrifice and obedience should again be made fruitful in every way for youth, and, of course, always in connection with definite examples, which can then be turned to good account as parables for all life. Thus, for example, a letter from the front describes the following scene in a hospital:

"During the operation, which took place in a church arranged as a hospital, a bomb crashed through the church window above. Some of those assisting at the operation instinctively jumped aside, others disappeared under the operating table and others tried to save themselves by hasty flight into the sacristy or behind the altar. The shell-splinters and stones clattered through the church windows, pieces of stained glass and of roof-ornamentation rattled down on the reddish floor-stones. 'Here we are operating!' said the surgeon unconcernedly; an energetic, 'Each one remains at his post!' from the assistant quickly caused the people under the table and behind the altar to hurry forth. Calmly, as if we were in the operating room of a hospital, we worked ahead, looked for ducts, nerves, applied ligatures and sewed muscle after muscle to a useful stump. After the ligature the patient opened his eyes again soon, and murmured softly and contentedly, 'Ah, how well I have slept!' He would scarcely believe that he had already been operated on and that, in the meanwhile, almost the whole church had been destroyed. Astonished and amazed he looked at the ruined church windows. We laid him carefully on soft straw and while the hostile missiles thundering outside completed their work of destruction, he was already sleeping along toward recovery with deep, calm breathing."

Such a narrative, which has special value because it deals with unwavering courage in wound-healing, not in wound-inflicting, is quite especially adapted to give deep stimulus to the inner life—but, of course, only when one calls attention to it not merely as a sensational anecdote, but passes immediately to the question, "How is such character to be developed, character that does not allow itself to be deterred from the fulfilment of duty by any fear of death? Will a man who allows himself to be called from work by every passing bird, every street noise, every tooth-ache, or any fancy be capable of remaining and calmly finishing his task during bomb-attacks or will he not rather belong with those who creep under the table? Accustom yourselves always, even in the smallest task, to think of all the great things that are thereby accomplished or abandoned—desertion and heroism are not first determined on the battlefield, but in every commission, in every arithmetic problem. Now in youth you have Hercules' choice before you, the choice between inconstancy and loyalty, between persistency and desertion, conscientiousness and pleasure-hunting." The great character-forming posibilities of the war lie in the very fact that all those *inspiring, collective accomplishments of discipline* now bring quite new inspiration even to laborious, dry, dull loyalty and self-control in everyday matters; all the forces of character which have won an entirely new glory through the brilliance of their successes from the point of view of world-history thereby preserve, even in school-youth, an entirely new vigor and can therefore be appealed to as an effective motive for everyday victories and exercise of duty. Thus, in the following way, among others, one might speak of the *miracles of discipline* and thereby illuminate the dry school-regime from the war horizon:—

"When first the news of mobilisation was posted on all the street corners, when the first dispatches came, 'The Russians in East Prussia' many a one thought with anguish, 'What will come of it? Are we really equal to an attack from three sides? Shall we not be crushed?' Then the barracks opened their gates, and troop after troop marched to the station with firm tread and stride, ready for action; nowhere was there even one scene which bespoke perplexity, disorder, lack of punctuality; the whole tremendous preparation proceeded like a dress-rehearsal; no one seemed excited and nervous—everyone knew where he belonged and what he had to do, and that the others would do their parts—and then there suddenly came over all an absolute peace and confidence; it was known that this entrainment there at the station was only a small picture of how, in the large, everything was premeditated and arranged and how everywhere plan and execution tallied.

"Whoever is mindful of what marvels German order, punctuality and accuracy are accomplishing in this war and of how troops far superior to ours in number could not withstand the attack of our troops, will here observe again in a large and inspiring picture, how only the power which is acquired by discipline and which disciplines itself is worth anything, and how world-conquering strength is harvested from years of loyalty on a small scale. Does not even all school-discipline and every other strict system at home and at business now stand in an entirely new light? It will no longer seem to you now a mere deprivation of liberty, an annoying suppression of personal wishes, but as preliminary practice for all great victories in life? Whoever of you is punctual, be it only in an engagement with comrades, whoever carries out a commission perfectly, whoever perseveres strictly and regularly in his place and in his duty, however many alluring voices call him away, belongs to the invincible army which is today accomplishing marvels of discipline in foreign countries. For, do not forget that great discipline was not created from above by violence, indeed it has been produced not in barracks-yards alone,—if a nation is slovenly in its habits, it cannot be reformed even in a barracks-yard—but thousands upon thousands have been loyal in private, year in and year out, and have done thorough work wherever their duty required and have sought distinction in absolute reliability; but it had to come to light some fine day and manifest itself in the inspiring spectacle that we have witnessed these past weeks.

"And have you noticed how, in these weeks, the example of one has strengthened the other—particularly when everybody noticed that everything was all right with others, when the bank officials saw how the general-staff had made provision, and when the general-staff saw how the banks had the money ready, and so on, to the locomotive engineers and firemen of troop-trains?

" But do not think that it is of no importance when, far from the big world, in the smallest village, someone does his part resolutely and punctually so that one can depend upon him as upon the rising of the evening star, be it only that he delivers promised boots punctually or never assists in the adulteration of food—all these men belong to the glorious army, even if they were never on the battle-field; they also are the ones who win our battles and make Germany irresistible."

"Bravery in daily life" would also be a theme by means of which, in the light of the quite new interest in *heroic virtues,* one might discuss the everyday temptations, tribulations, and conflicts in school and home and, at the same time develop the idea of bravery in all its ramifications—not least of all with respect to the cowardice of white-lies.

The terrible suffering in this war, resulting from bomb-splinters, frost, dampness, and every kind of privation, and the way in which all this is borne, the simple, silent heroism, which always asks only, " What is my duty?"—that is likewise a very fruitful theme for influence on youth, especially pampered youth. " When you think of making a great deal of some unfortunate love-affair, or a decayed tooth, or any other painful or unpleasant thing, think only of the trenches, of the mines, or of the hospitals, or of those whose dearest and most beloved are shot down today as if they were nothing and belonged to no one; then you will be horrified at your assumed importance, and what formerly seemed quite a matter of course to you, the everlasting talk about your own little ego, you will recognize as monstrous and ridiculous effrontery. And that is a life-long benefit, for, those who persist in being puffed up and in clamoring about their own adversities and vexations become out-of-sorts and discontented in life—only he who humbles himself can become big, sound, productive."

Also a word for the children who have lost relatives in the war might be spoken here, perhaps referring to the saying, " The blessing of the father builds houses for the children." But, what blessing can emanate from a father who has fallen on the "field of honor"? an admonition, an assistance so that the children, during their lives, may remain and fight on the " field of honor "—sons and daughters; further, that the father can be kept alive in the children and continue to guide and counsel them, if they henceforth judge all their acts and thoughts from the point of view of his death-sacrifice and remember the " Iron Cross " as a symbol for all brave accomplishments in life.

In the direction here pointed out many proposals will, of course, be made and have already been made. Therefore I should like to turn to another, just as important, pedagogical view-point, which, in the general and legitimate national exaltation, is easily disregarded; that is the counter-effect to the *dangers* which the war, or let us say, the department of war-news and interest in it occasion for our youth. It is a fact often psychologically observed that the demoralizing effects of the war affect those who directly risk their lives,—who, by all the frightful impressions of death and destruction, are cured quickly enough of an abstract war-enthusiasm—far less than those who merely hear of the successes and heroic deeds and receive no vivid picture of the horror of war. Among those away from the front, and especially among inexperienced youth, there arises only too quickly, from too much interest in war news, a *flippant exultation* over the nameless misery which both friend and enemy pay for the success which is announced in laconic figures by the war-dispatches. A girl in her teens comes from a street-corner where the German naval victory off Chile is posted and says jubilantly to her friends, "Have you read? Magnificent! Fifteen hundred Englishmen drowned off Chile!" I do not consider such things harmless. For the stay-at-homes war can become a school of heartlessness and thoughtlessness if a very earnest counter-effect is not given at the right time. As a teacher, I would, on such an occasion—or even before-hand as a precautionary measure—say with great emphasis, "Listen; whoever is not yet so fortunate in these war times as to be permitted to bind up wounds and nurse the wounded, shall at least *think* of the wounds which war inflicts and of the broken hearts and happiness of the thousands who thereby lose what is dearest to them—therefore, even in our joy over victory, there should always sound a minor note. Do you know what 'minor' means and how it can be expressed? What a loss for us if the others should lose their ships, but you should lose your hearts!"

The challenge has been given to allow youth to *have its own share of war-experience.* That is incomparably more difficult, however, than it looks on the program. For the more the stay-at-homes hear and read of the war the less they *share in experiencing* it and the more false becomes the picture of its real nature, because, for obvious reasons, the press offers little of the *appalling side* of all war-successes. From time to time the shining beacons of a new heroic achievement flash—but in between lies the silent unilluminated heroism of daily endurance under quite inconceivable conditions, and between lies also the equally silent and unilluminated work of the reaper, Death.

To give youth even an idea of the actual reality of the war is to evoke numerous *psychoses*—and again, to delight in the war and its successes *without* making them realize the dark side is really not *having them share in the war,* but is duping our young people into an entirely false picture which may then become the cause of their taking the war very lightly and later acting accordingly.

Therefore I am convinced that war-hours and war-talks in school can be of actual benefit, in the first place, only when they are concerned with essentials and ethical values more than with too direct war-enthusiasm for war and success, and when, in the second place, they are held in a certain subdued tone as one celebrates Christmas in a house where a great misfortune has occurred. Whoever does not understand how to introduce this " minor " into such exercises is no custodian of real German feeling and misses his high pedagogical task of defending German civilisation in the soul of youth against the demoralising effects of war.

At the time of the Spanish-American war, in a street in America, I once came upon a group of boys who were impaling frogs on knitting needles and said in explanation, " We are killing Spaniards." That gave me food for thought for a long while. The monthly notices of the deaths in the various armies by bayonet-attack, mass-attack, by explosives is an absolute danger for our young people—exactly because they are *not* present and do not see the terrible suffering which might awaken their sympathy and create in them horror of war—as happens for all the young people who are at the front today. The teacher can, of course, not prevent all that news from reaching the young people, but he can at least give an *antidote* and it will consist in turning all his energy against the malicious, scornful and brutal talk about " our enemies." Not by mere prohibition and moralising, but perhaps with reference to the following popular saying, " In war either action or silence is seemly—by abuse no battles are won. ' When Israel battled against the enemy, Moses prayed—he did not abuse!' Our armies conquer by their *discipline*—if you wish to be spiritually allied with them, preserve discipline in speech, control your unbridled words, do not indulge in hatred and censure. You know that hatred for the enemy diminishes as the ' square of the distance ' and becomes less the longer and nearer both parties stand opposite each other at the front." (Let evidence of this be adduced and have the pupils tell stories of it and have this psychological fact explained.)

In the reports of the schools of Wuertemberg (No. 6.)

Professor Prodinger writes for youth and others, "'Woe to those,' a German clergyman rightly exclaims, who had apportunity to see the horrible battlefields in France, 'woe to those who bear the frightful responsibility before modern and world history for this dreadful war, for the sorrow of the bloodly struggle of nations which no human being and no pen can describe!'

"We shall win, that is without doubt, and we shall become the lords of Europe.

"Yet open Holy Scripture and you will find a sentence that sounds as if it had been written today. 'What would it profit a man if he shall gain the whole world, but suffer harm to his soul?' We are on the very point of gaining the whole world; let us take care that we suffer no harm to our soul! That would happen, however, if we should forget that even in this war brother is fighting against brother, if we allow to arise in our hearts feelings of hate and contempt for the individual who bears arms against our country."

I once heard how a boy fourteen years old, who belonged to a Gymnasium Navy League was asked by a foreigner, of the same age, what was to be done with all the new ships; he gave the answer; "We are going to blow you up!" From such answers can be seen how harmful it is to involve immature, young people in the details of the defense of the country. True war-pedagogy, as far as it has to do with the preparation for war efficiency, will fundamentally disregard such premature dedication to the interests of adults—that promotes only megalomania—rather in work and in sport there should be laid *foundations of character* on which the accomplishment of the German army rests and, above all things, the cultivation of the German soul shall not be harmed by mere playing with the mercilessness of war. For the very fact that we have a *civilization* to defend and are not merely a war-folk is the very thing that gave the present military exaltation of the German people so powerful and moral an *élan* and reserve.

Field-Marshal Hindenburg is said to have given the following answer to an Austrian Gymnasium-class which sent him a letter of homage; "Don't think of me at all now, but only of your lessons; *you* take care of your studies and *I* will take care of the Russians!" In this answer lies more genuine war-pedagogy than in many well-meant, unpedagogical suggestions which are being made today by educational specialists for the "participation of youth in the war." Nothing would be more unbearable than a new youth whose self-assertion would be thundered forth by our new mortars and which would be allowed, in the dearly-bought, powerful position of its people (for which it has as yet accomplished nothing) to revel with words and feelings in the consciousness, "See, we belong to those people there with the big guns!" *Videant consules!*

A very difficult task is placed upon the teacher by the wish expressed by some authorities that the greater German victories in arms should be celebrated in the schools, too, by addresses. The wish is justifiable and the task full of good pedagogical opportunities—but also full of dangers, or will our philologists not herewith recall all that deep, religious feeling prompted Greek and Roman generals to say against victory celebrations. It was profound dread of pride, of challenging the gods, that made the heathen shrink from any too strong emphasis on personal or national success. Our piety, in contrast to that, has become very superficial, although Christianity has made a great ethico-religious conquest of "*γβρις*." We imagine that victory is a direct reward from God for our superiority and may, on that account, be jubilantly acclaimed without restraint. But may a victory not be permitted by Providence also as a great temptation and test? Does not victory have on men of all kinds a quite remarkable effect, dangerous for the higher faculties? So that mundane triumph might appear to a more penetrating glance to be rather a curse, a divine alienation, and not a divine blessing—even though man accepts it in that spiritual attitude which antiquity prescribed? At any rate, in the ancient aversion to all celebrations of victory, in that pious dread of vindicating and enjoying victory simply as a merited gift of God, there is a far more humble deference toward the inscrutable mystery of divine decree than is expressed in our hackneyed war-metaphysics. That demand for the greatest discretion in joy about one's own good-fortune, that dread of any too express delight in one's own superiority was certainly anything but superstition; behind it stood, rather, the profound presentiment that every worldly success denotes far more probably an affliction than a favor from God and that that hidden curse of triumph may be transformed into a blessing only by extraordinary humility and unobtrusiveness.

There is, morever, also a purely ethical motive which should actuate great discretion in victory celebrations. Behind the dispatches of victory we read always of the "heavy losses" of our enemy, yes, often of "mountains of corpses"; we know how many foreign tears and how much mourning our triumph connotes. Awe of the misfortune involved in our success, the social feeling which links us with the distress of others, and especially in our time is so deeply awakened, all these impulses must not be stifled by victory-jubilation; on the contrary, they must suppress it—or the curse of victory is already upon us! For the above reasons it is of great importance for the ethico-religious education of our youth that in official discussions of national success the teacher understand how to repair the honor of that ancient awe of "*γβρις*." That can first be done by a chivalrous word about the defeated and then by dispensing, at all such celebrations, with all national self-praise. Let us be satisfied with the statement of essentials; let us mention exemplary traits in the heroism of war-life; especially and finally, let us not fail to say something about our moral attitude towards success—even success in school—and about the dangers of success, with direct reference, perhaps to the above-mentioned ancient ideas. Let us explain why it may be not only "*vae victis*" but even more rightly "*vae victoribus*" and how the individual and the nation can sustain trials of strength, and preserve modesty and magnanimity without which they are odious to God and man. Thus school youth is kept clear of the intoxication of victory—and that is of great importance for complete moral development.

The third task for the guidance of youth, in the midst of the present world-war, is inner preparation for the *inevitable reconciliation of the nations*. Much that was suggested in the foregoing for the counter-effect to hate belongs also to this folk-uniting task of the present pedagogue. There are today, unfortunately, even university savants who travel around preaching race-hatred—we educators have, of course, the holy duty of not indulging in the passion of the hour, but in preparing our youth for the great future task of human civilization. For this kind of influence, of course, only the older pupils are to be considered. To the younger generation it must be stated that, and why, nations are today admonished to reciprocity and partnership, and what moral conditions of such partnership are to be cultivated in every nation. For this moral adjustment to the joint-responsibility of humanity, it is fitting above all that each nation should not only be conscious of what special mission it has for the other nations, but also what it has already received, itself, in the way of important additions and suggestions from foreign nations. In this sense,—in spite of the unreserved condemnation of the powerful politicians of present-day England—this theme should be discussed today: What does our social civilisation owe *English* civilisation? What have we to learn from the English? And further, what do we owe to *French* civilisation? What more has it yet to give to us and the whole world? Such questions shall not approve of the silly predilection for what is foreign which we enjoy in reference to the *externals* of our striving for civilization; on the other hand, they shall right now direct the young generation to the fact that hegemony of Germany can be reasonable, enduring, and beneficent, only if this hegemony—with complete preservation of the national principle—becomes a *German leadership to constructive, folk-uniting world-policy* and to paving the way for the "United States of Europe." *The world-policy of national egoism* will, of course, be reduced *ad absurdum* by the world-tribunal of this war—if from it a purification of the whole civilized world and a new order of all national relations, based on deep foundations of civilization, arises, the terrible sacrifice will not have been in vain. If, however, the world should continue to be governed *by the old methods of mutual fraud,* the sacrifice would be in vain and a new world-conflagration would burst forth in which human civilization would be consumed.

The pedagogical tasks mentioned above must, of course, be grasped at the roots. That is, in every proper scope granted to the fighting instincts of youth, especially at the "Indian" age, in connection with the world-war, *practice in establishing and maintaining peace* must become a new theme for the guidance of youth; the paths which are to be found there are far more important than all the paths sought today by youth. Let us tell young people quite frankly that they are responding to the war-spirit falsely if they are doubly ready to fight in home and school, and if they immediately declare war against anyone who attacks their sense of honor and rights. Even in the present war we have surely seen how much it means for a good conscience and the weight of defense when one can say that one has first used every effort to mantain peace. Our emperor gave to the enemy the *advantage in mobilisation* because he wished to assure to Germany the *advantage from love of peace.* From this advantage, however, has developed the greatest momentum of our defense. Therefore, practice in understanding, in the power to imagine one's-self in another's place, in chivalrous advances, in good-will about compensation is just exactly as important for the right *moral* preparation for an unavoidable national struggle for existence, as is practice in military matters. Let us give example of youthful conflicts, even between children of the same family, and let youth occupy its own inventive powers in the discovery of peaceful solutions. Of course, too early and absolute peacefulness in youth is not natural nor educative—in boys' fights much hidden ethics may often lie—but we allow our youth to grow up too much like Indians; we forget too often that *heroic and chivalrous traits of character* can first be practiced rightly in *estab-*

lishment of peace and that this practice becomes more and more indispensable subjectively and objectively for our entire civilization; and as has been said, "Only the sincere peacemaker can in case of extreme peril speak of an 'honorable war.'" I should write on the black-board, "Who is to blame for the world-war?" and have the children guess in vain until I say myself, "Every one who thought only of himself and his rights, everyone who provoked others by arrogant talk, everyone who immediately flew into a passion when he felt his sacred sense of honor injured in any way, everyone who forgot that, in a quarrel, no *one person* alone is entirely right, everyone who expressed or spread, violent, coarse, incorrect ideas about another, everyone who could not stand the success of another—all these unpeaceful people have worked to stir up general hostility in the world; they have summoned the evil powers from whose rage the world conflagration was kindled." It is very important in this sense to show youth its own characteristics in the light of the great tragedy of life: "See *that* is the spirit which keeps war in the world, which throws bombs, destroys cities and drives entire nations against one another in rage and hatred!"

This kind of stimulus belongs especially in the *girls' schools.* Women have not hitherto done their duty in preventing the world-war, and they are not doing it today either. Indeed one hears from women, more than from men, talk filled with hatred, and emotional judgments about foreign countries. All too seldom do women talk for peace when it is a matter of men's fighting; much too often do they contribute inflammatory talk and excited condemnation so that a breach is hastened or other premature decisions are made. How unusual is Iphigenia, who overcomes the racial curse of hatred and of force by sheer humanity! How rare is Antigone, who loyally keeps faith with the mission of women! *"I am not here to share in hatred but in love!"*

Truly to day is the hour when all mankind must think of "Blessed are the peace-makers" and must call a halt to this recklessness of hatred and provocation; and now is the time for our young women, in view of the frightful events in the world, to burn into their hearts once more with sacred fire the Christian mission of woman: that she may assume her peaceful mission with more consideration, not in programs and ideas, but in habits of judgment in everyday life, that she may think more of the *sacredness and responsibility of speech* and use all the conflicts of life to exercise the strength and effect of the peaceful, uniting, reconciling voice of woman. That is the most sublime *"franchise of woman."* Women think today that their mission is accomplished if they bind up the wounds that men have inflicted—but their highest mission lies in preventing the infliction of wounds and of making a sacred science and a sacred art of maintenance and establishment of peace in all circumstances.

If the generation of teachers who have remained at home should no longer feel that they must do everything to educate youth in the above sense for the *reconciliation of nations* and, in this sense, also, to discuss the present war, then the generation which is returning from the frightful tragedy of war-events, which is debarred by shattering impressions from all traditional ideas, will take hold of the task with most profound seriousness. May God direct !

THE ABILITY OF THE SPECIAL CLASS CHILDREN IN THE 'THREE R'S'

By Maud A. Merrill, Research Assistant, Minnesota School for Feeble-Minded

Since universal compulsory education has placed in the public schools, children of widely varying abilities, within the last twenty-five years the schools have made special efforts to replace the old procrustean efforts to adjust the child to the school with the more humane modern methods. We estimate that, according to the law of averages, the public school system fits about half the children. The statistics quoted by Stern from Bobertag's experiments with German school children bear out this estimate. Of the other half, one quarter could be advanced more rapidly and the other quarter must progress at a slower rate.[1] Assuming that practically half the children make a grade a year, first graders being six to seven years of age, second graders seven to eight and so on, we might define the task of the special class as an attempt to find out how the other half learns. The task of trying to determine how rapidly the superior child can and should be advanced is one that comparatively few schools are undertaking and the superior child may frequently prove the troublesome child because he hasn't enough to do to keep him busy and out of mischief wherefor, also, he acquires lazy mental habits which are bound to persist after the formative years of his school life.

The special or ungraded class in the public schools usually includes at least two types of children, the temporarily backward and the feeble-minded. Its objects are two: to relieve the regular grades and to educate or train the atypical child. What we expect of the special class child in the way of education depends upon what we expect of him in the matter of his future adjustment to society. The Cleveland public schools divide special class children into two groups according to their social competency or incompetency. The socially competent are those who will probably be able to earn a living without supervision and under this group are classified the blind, deaf and crippled children. The socially incompetent are those who will probably always require more or less supervision. Under this second classification are the children in the ungraded or so-called "subnormal" classes, usually the only special classes in the school. These children may be educable but to what extent? They are all trainable, but to what extent? And if they are both educable and trainable to what extent shall we emphasize the one at the expense of the other? If they are educable how much of the fundamental "reading, 'riting and 'rithmetic" that their limited capacity permits them to acquire, is going to prove socially useful to them? How useful will training, and by training I mean industrial training, be to them in their attempts to meet the requirements of society or to contribute to their maintenance under supervision?

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[1] Stern: "Psychological Methods of Testing Intelligence."

The answers to these questions constitute the immediate problem of the special class. To determine in how far these special class children are capable of education, we rely primarily upon our mental tests. To determine in how far they are acquiring the three "r's," we have been applying the now fairly standardized educational measurements or pedagogical tests.

The group of children whose three "r's" ability this report covers, consists of children from the regular grades, who have been examined mentally and pedagogically for the special classes of several school systems in Minnesota and also children in the school department of the Minnesota School for Feeble-Minded who constitute a similar group. The institution children average more years of special training than the special class children. The range of ability represented in the group examined varies from mental age five to mental age eleven and a fraction, covering grades from kindergarten to fifth grade. (And it is literally *to* fifth grade as no child is able to do fifth grade work in all of the three "r's.")

Prof. Mitchell cites in his Cleveland School Survey [2] glaring examples of poor economy in the herculean tasks set the special classes in the attempt to teach certain children. The story of the boy who spent seven years in the special class after having attended the regular grades for three years, with the result that he is able to write laboriously such simple words as "my," "see" and "dog" but is unable to read the words after having written them, is followed with the terse comment, "The city has paid about $1,000 for his education."

The pedagogical measurements used are all individual tests adapted from the Starch tests in Reading and Spelling, the Courtis Arithmetic tests and the Ayres and Thorndike Writing tests. They have been given in connection with the child's mental examination and have been selected with reference to the child's mental age in each instance.

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[2] Mitchell: "Schools and Classes for Exceptional Children."

The reading tests are all measurements of oral reading. The child's mental age was taken as the index of his intelligence and the reading test results express the measure of the mechanical aspects of reading; account was accordingly taken of mispronunciations which indicated unfamiliarity with the word, or errors of substitution and omission, of hesitations and of the rate of reading. For instance the mental eight year old was given the second grade reading passage and his failure or success with that passage indicated whether he should be tried in a higher or lower grade passage, several passages being tried in this way, until his reading ability was determined. The spelling tests consist of lists of words of known difficulty and the score is expressed in terms of a percentage of the total list of 100 words. The standard first grade score is 10%, the second grade score 30% of the list, etc. In the writing tests only quality was measured. The writing specimens were compared with the samples in the Ayres and Thorndike scales and were graded three different times by each scale, the score being the average. It is probable if the writing speed had been taken into consideration the scores would have been markedly lower in many instances. The arithmetic tests are the standard Courtis tests. Series "A" was given to test a degree of ability below that required to handle the more complex processes of carrying and adding longer columns. Besides these simple number combinations, series "B" was given in which the more complex functions were required. Arithmetical functions involving reasoning were not even attempted.

Table I shows the average grade attainment of each mental age from the mental sevens, who should attain first grade to the mental tens who should attain fourth grade. The number of cases beyond mental age ten was so few that I have not shown them.

I.

AVERAGE GRADE

Mental Age	VII	VIII	IX	X
Av. Chr. Age	15.8	14	14.7	16
Reading	.9	1.3	2.3	2.8
Spelling	1.	1.5	2.7	3.3
Writing	1.7	2.3	3.3	3.3

DISC. OF TABLE. The Roman numerals at the top show the mental ages of the group tested. The average chronological age for each mental age group is given and the average grade attained by each mental age in spelling, reading and writing.

Ex. The mental eight year olds attain 1.3 grades in reading.

It is significant that in each instance the mental tens fall farther below the expected grades than do the children of any other mental age. In reading, where they should attain fourth grade they do not attain even third, in writing, in which the other mental ages excel, they attain only a fraction more than third grade. The tests in arithmetic have not been standardized below the third grade and the performances of the special class children in arithmetic are so poor that I have not attempted to show the average grade attained.

The Arithmetic table,—II—however, shows how far short the mental nine and ten year olds, fall in the fundamental operations in arithmetic. In the first series involving only simple number combinations the mental nine year olds attain only 55% of the standard score in addition, and this is the highest attainment. In the second series where the addition of longer columns and carrying are required, the result is even poorer.

II
ARITHMETIC

	Series A				Series B			
% Stand. Score	Add.	Sub.	Mult.	Div.	Add.	Sub.	Mult.	Div.
M. A. IX....	55	31	32	13	33	17		
M. A. X....	40	35	23	12	30	42	33	25

Even where the feeble-minded child seems to be able to perform arithmetical operations in a mechanical sort of way, he frequently fails to grasp the abstract idea of the process so as to be able to apply it. Supt. Johnstone of Vineland, New Jersey tells a story which illustrates admirably the inability of the feeble-minded child to use ideas of subtracting other than in the concrete instance to which he is accustomed. John was asked, "Suppose you took six ears of corn to your horses"—but John said, "We don't take them six ears of corn"—"But just supposing you took them six ears"—John said, "We don't take them six ears." In other words he had not used this number in that connection. He was then asked "Suppose you took them twelve ears of corn, and only fed them ten, how many would you take back?" He said, "Two." "How much are twelve less ten?" John said, "Oh, I don't know that many." "Suppose you took twelve loaves of bread to Mrs. A. and she only wanted ten, how many would you take back to the store-room?" "I don't go to the store-room." "But supposing you took her twelve loaves and she only wanted ten, how many would you have left?" John thought and thought and finally said, "Three."

In reading, the results show an increasing inability to maintain the standard that the grade of intelligence would lead one to expect. The table at the left of the reading chart—III—shows according to intelligence quotient the number of children who read at the proper grade for their mental age and those who are advanced and retarded. The intelligence quotient, the ratio of the age to the mental age, expresses mental development in terms of the per cent. of normal development. An I. Q. below 50% places the child in the imbecile grade, from 50 to 75 constitutes the moron grade, from 75 to 89 children are classified as backward.

III
READING

I. Q.	At Grade	Adv.	Ret.	Total
40-50...	3	2	3	8
50-60...	17	6	14	37
60-70...	22	13	44	79
70-75...	12	2	11	25
75-80...	8	1	7	16
80-86...	3	1	8	12
Total.	65	25	87	177
Per cent	37	14	49	

M. A.	VII		VIII		IX		X	
Grade	No.	%	No.	%	No.	%	No.	%
I	13	40	19	54	5	54		
I	18	50	11		8		2	70
II	3	10	18	33	10		6	
III	2		5	13	13	30	4	
IV	1		1		7	16	3	18
V			1		1		2	12
Total..	37		55		44		17	

In this table I have shown the distribution of ability from 40 to 50, from 50 to 60, from 60 to 70, from 70 to 75, from 75 to 80 and from 80 to 86 which covers the variation in abilities of the special class cases. Only 37% of the children read *up to grade,* while 49% of them *areretarded,* and only 14% *advanced.* That is, in 37% of the cases the mental age of the child corresponded to the normal age for his reading grade. In 47% of the cases, the reading grade attained was higher than the expected grade for the mental age, and in 49% of the cases the mental age was higher than the normal age for the reading grade.

The table at the right shows the number of cases at each mental age who do first grade work, less than first grade work, second grade, etc. The reading score shows a steady decrease in the percentages of children able to do the reading of their proper grade. Fifty per cent. of the mental seven year olds do first grade reading, 30% of the mental nine year olds do third grade reading and only 18% of the mental ten year olds are up to standard in fourth grade reading.

The spelling results are somewhat better. The process is more mechanical than reading. The spelling scores (Table IV) show, however, 33% of the children in their proper grade, 22% advanced and 45% retarded.

IV
SPELLING

I. Q.	At Grade	Adv.	Ret.	Total
40-50...	4	2	3	9
50-60...	16	9	10	35
60-70...	22	20	36	78
70-75...	6	3	12	21
75-80...	4	3	9	16
80-86...	4	1	6	11
Total.	**56**	**38**	**76**	**170**
Per cent	33	22	45	

M. A.	VII		VIII		IX		X	
Grade	No.	%	No.	%	No.	%	No.	%
I	12	31	9	49	2	47		
I	18	46	16		5			
II	6	23	16	31	13		5	60
III	3		10	20	11	25	5	
IV					9	28	3	17
V					2		4	23
VI					1			
Total..	39		51		43		17	

Here, too, we note a decrease in the percentages passing at the higher mental ages; 46% of the seven year olds do first grade work; 31% of the eight year olds do second grade work; 25% of the nine year olds do third grade work; and 17% of the ten year olds do fourth grade work.

The feeble-minded child has little or no idea of the logic of spelling, of any connection between sound and letter. One small boy of my acquaintance spelled with amazing agility any word that I gave him, regardless of any possible connection between sound and sense. When asked to spell corn he inquired whether I wanted him to spell one ear of corn or a whole field full. Upon being assured that I would be satisfied with one ear he carefully spelled "r-h-n." But when asked to spell a whole field of corn he said "c-m-i-h-l."

With writing the case is quite different. Here the process is a mechanical one to a great extent and the experience gained in his longer training shows in the quality of work done by the feeble-minded child.

V
WRITING

I. Q.	At Grade	Adv.	Ret.	Total
40-50...	5	2	2	9
50-60...	9	17	9	35
60-70...	23	31	26	80
70-75...	6	9	5	20
75-80...	6	4	7	17
80-86...	5	1	6	12
Total.	**54**	**64**	**55**	**173**
Per cent	31	37	32	

M. A.	VII		VIII		IX		X	
Grade	No.	%	No.	%	No.	%	No.	%
I	8	21	8	22	1	27	1	44
I	13	34	13		6		2	
II	7	45	12	38	5		3	
III	3		8	40	14	32	1	
IV	6		6		6	41	5	31
V	0		5		7		3	25
VI	1		2		5		1	
VII			1					
Total..	38		55		44		16	

So in this Table V we find the largest percentage of children advanced 37%. Only 32% of the children are retarded and 31% at grade. When we consider the number of mental seven year olds who make first grade we find 34% at grade while 45% are above first grade. Of the mental eight year olds 38% make second grade and 40% are advanced; 32% of the mental nine year olds make third grade and 41% are advanced. But of the mental ten year olds 31% only are up to fourth grade standard while 44% are retarded and only 25% advanced.

In this study of the three 'r's' ability of special class children, it is probable that more extended investigations will show some variation in the results.This is but a preliminary survey. It is probable that the reading tests may show some deviation when the oral method is more carefully standardized and, in comparison with Starch's silent reading tests, may grade a little higher. The rate of silent reading with which the present comparisons have been made will probably prove to be a little too high even in the lower grades with which these comparisons have been made. So, too, in the writing some details of procedure remain to be worked out, which may reduce the general writing average. Undoubtedly, on the whole, the tendency of special class children to fall below the expected grade for their mental age, is very marked.

VI.

AVERAGE ABILITY

ARITHMETIC	30%
READING	75%
SPELLING	87%
WRITING	119%

These children then, have an average chronological age of fifteen years. In arithmetic they attain only 30% of what they are expected to attain at their mental age. In reading,—in which they attain average grades of .9, 1.3, 2.3 and 2.8 when the average grade attained should be 1, 2, 3 and 4,—this ability expressed in terms of a per cent. of the average ability, is only 75. That is, in reading, the special class children do only 75% of what they are expected to do for their mental age. So in spelling where they attain average grades of 1.0, 1.5, 2.7 and 3.3 instead of 1, 2, 3 and 4, they measure up to 87% of what they are expected to do for their mental age. And in writing where they exceed the expected grade 1.7, 2.3 and 3.3 with the exception of the mental ten year olds who fall short of fourth grade work in writing attaining only 3.3 grades, the ability is 19% above the expected score for the mental age.

School performance depends, of course, "not only upon intelligence but upon other and quite different factors." And it is these " other factors " in which the feeble-minded are conspicuously lacking. These factors belong to the domain of will and consist, according to Stern's analysis, of " degree and duration of attention, industry and conscientiousness, sense of duty and capacity to fit into the social group."

In striking contrast with the poor results obtained with the educational work, see what these same children are able to do with their hands! We have seen that they are only to a very limited extent educable. They are trainable and to what further extent.

We will take only one mental age and note briefly the various kinds of work which children with a mental age of seven years can be trained to do satisfactorily. On the school records these children are graded according to the quality of the work done as " Poor," " Fair," " Good " and " Very good."

Without going further into detail, we can see that the range of occupations, which can be satisfactorily carried on by the feeble-minded *under supervision* is comparatively wide when we consider their limitations in the common school branches. This correlation between mental age and skill in manual work has been worked out with minute care for each mental age.

VII

MENTAL AGE VII Girls

Work		Poor	Fair	Good	V. Good
Arts and Crafts:	Reed and Raffia		1	1	
House work:	Sweeping Setting table Washing dishes Scrubbing Bed making	6	11	19	2
Sewing:	Hand sewing Carpet rags Basting Machine sewing Mending	1	5	16	
Lace making:			1	5	
Weaving:	Rugs Linen	1	2	2	3
Knitting and Crocheting			2	1	
Laundry:	Sorting Ironing starched clothes Mangling Ironing unstarched clothes	1	6	19	2
Tailor shop:	Button hole machine Coats and blouses			1	1
Total per cent		8	25	60	7
Total number of cases		9	28	64	8

VIII

MENTAL AGE VII Boys

Work		Poor	Fair	Good	V. Good
House work:	Scrubbing				
	Polishing				
	Sweeping		2	1	1
	Bed making				
Laundry:	Washing				
	Sorting clothes	1	1	3	
Kitchen:	Cook's assist.		1	1	1
Scullery:	Washing utensils			2	
Outside	Teaming				
	Lawn work		3	1	2
	Pick and shovel				
Shoe shop:	Repairs		1		
Bakery:	Bread cutting			1	
Steward's helper				1	
Brush making:		2	3	8	5
Rope Braiding:				1	2
Bench work:			2		
Caning:			1		
Net:	Beginning	2			
	Bag	2 }5		2	2
	Fly net	1	1	6 }10	2 }8
	Hammock			2	2
	Tennis net				2
Total number cases		8	15	29	19
Total per cent		11	21	41	27

Although this is but a preliminary report of a much more extended investigation of the three " r's " ability of the feeble-minded, and there remain to be worked out details of procedure in evaluating scores, a carefully standardized series of individual reading tests, and a less subjective method of scoring for writing tests, yet this much is evident from the present data.

The object of the special class work of which we must never lose sight, is to adapt the education and training to the capacity of the individual with a view to his greatest usefulness to himself, and to society. If we can teach the child to read for his own enjoyment, well and good. If we can teach the child to read so that he will be more efficient as a member of his community, well and good. But if we are going to spend time and energy teaching him to read so that he can make better brushes, which a child with a mental age of four can do, we might better save our energies for teaching him how to do better net work. In teaching these subnormal children the three "r's," as Miss Farrell says, "We are asking them to use the finest coordinations and those most recently acquired in the history of man . . . They have to use the large crude movements. They have to do things primitive man did and do them in a primitive way. We cannot ask of them the finer coordinations of more highly developed people."

THE VOCAL TREATMENT OF STUTTERING*

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The object of this paper is to offer some practical suggestions as to the treatment of stutterers, especially class treatment as worked out in certain public schools. In a paper of such limited length, it is impossible to even mention any other phase of the subject. It must be assumed that the reader has some knowledge of the physical, psychic and social significance of this disease.

Generally speaking, the value of vocal training is questionable unless its relation to the mental and emotional conditions in the patient's life is made clear. Any system, demanding a persistent vocal training might succeed in some cases; but it is only when the other elements of treatment are considered also, namely, a re-adjustment of physical conditions, and an analysis of the mental and emotional attitude of the patient, that a permanent cure may be expected.

To be sure, occasionally, a case of stuttering may be found in which re-adjustment is seemingly impossible. Nevertheless, the instructor who has a scientific knowledge of the case is better equipped to handle it. Neither mental treatment nor vocal training alone is desirable; a happy medium would be a reasonable combination of the two. But if a choice were necessary, it would be that of persistent, intelligent vocal training.

Assuming then that in every possible way, physical and hygienic conditions have been improved, and an attempt made to help the patient to self-understanding, the following work in vocal training is suggested. It is based on Dr. Smiley Blanton's outline for treatment. Certain exercises are given in detail. but are merely suggestive of the many others that ingenuity might conceive. Some of them have been suggested by a study of the different methods used by certain specialists; many have been worked out through actual practice with classes of stutterers.

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* The scheme of vocal training presented in this paper follows to some extent but only in a general way, the system of training advocated by Dr. Smiley Blanton of the University of Wisconsin, with whom the writer studied for a time. Some of the exercises are original, some were taken from Dr. Scripture's books on stuttering.

Treatment of Stuttering

I. Physical — Hygiene

An important element in treatment. If necessary, the physical condition must be improved in regard to nourishment, sleeping habits, exercise, sex habits, fresh air, etc.

II. Vocal Reeducation.

1. Breathing (to develop poise and remove the symptom of spasmodic contraction of the diaphragm).
2. Tone
3. Inflection
4. Pitch
5. Phrasing

   to overcome constriction of vocal cords.
6. Articulation
7. Relaxation
8. Rhythm

III. Mental and emotional Readjustment.

A careful study of the emotional forces of the patient's life may show fundamental reasons for his affliction.

The value of all these exercises is partially suggestive. A confident, cheerful, encouraging, definite attitude must be maintained. Certain embellishments to these exercises may be valuable in as much as they are purely suggestive. Encourage spontaneity on the part of the pupil.

Suggestions for Treating a Class of Stutterers

Before beginning any class work, give each pupil some individual attention, finding out something of his history, and the type of child you are to work with. Greater details may be gained later. Then organize the class with respect to age, grade and similar conditions.

Arbitrary rules governing class periods cannot be made. It has been found generally more successful to have periods 30 minutes daily. If possible, the instructor should have a half hour preceding each class, during which time, she might give individual attention to certain pupils two or three times a week, as the case might be. This time could be used in obtaining histories, giving certain suggestions which could not well be given in class, and so forth.

To older pupils especially, a brief explanation should be made regarding the kind of habit of speech they are to acquire, more expressive, slower, quiet, and of better pitch.

By suggesting some of the exercises to be used—the use of rhymes, pictures, certain games, and so forth after a few days have been spent upon breathing and relaxation exercises—interest, attention, and a desire to do well all that may be required will be aroused.

Taking into consideration the age and type of stutterers in the class, explain simply some of the reasons why they stutter, calling attention to the symptoms—poor breathing, indistinct articulation, monotone, lack of expression and poise, tenseness —rather than to the fundamental causes. This must be done encouragingly, impressing the pupil with the fact that while you can help him, he can help himself more by carefully, and persistently practicing all the exercises. Ask them to think of their own voices and notice what is lacking.

Almost without exception, the children respond to this attitude with anticipation and confidence.

A few other suggestions might well be made: First, have the pupil restrain his speech as much as possible for the first few weeks. To demand absolute silence from one not removed from his usual environment is useless. However, some restraint may encourage the habit of reflection and courtesy to others when they are talking—this is often found lacking in stutterers, though perhaps not intentionally.

In a class where so much freedom is desired, it is very important that the teacher be firm, though pleasant, in all necessary demands.

Also important is the plan to impress the class with one definite aim each day—though the teacher may have in mind several objects.

The exercises as outlined in each lesson need not be followed in routine fashion. The repetition of any exercise must depend on the discretion of the teacher. Difficult exercises must be taken up very deliberately in order that the pupil may not be discouraged.

LESSONS

(Reference should be made to exercises given on breathing, inflection, tone and rhythm; also to Scripture)

1. Object to obtain right attitude of the class—interest and attention.—Also to make them understand the type of breathing necessary, and the reason for relaxation.

   1. Relaxation: make this as cheerful as possible; devise games such as "The Ragman," and "Go to Sleep." Continue for several minutes. Have each part of the body relax.

2. Breathing: " Notice how I breathe." Have pupil take correct position, one hand upon chest the other at lower end of breast bone. Refer to Exercises. If necessary, use a couch. Do not begin specific exercises until pupil understands the type of breathing desired. Suggestions might be made regarding the feeling of quietness accompanying this sort of breathing.
3. Alternate Breathing and Relaxation.

2. To begin control of breathing by certain exercises and to test power of the class to relax.

If a general idea of the kind of breathing necessary has been obtained, begin work on exercises.

1. Use every conceivable method to arouse and stimulate interest; observance of others in the class, having the most successful one demonstrate, etc.

   Ex. 2, inhale slowly 4 seconds, hold 2 seconds, exhale 4 seconds, rest. Did pupil feel the gradual extension and relaxation? Number of repetitions of any exercise would depend on the success of the class, and their interest.
2. Exercise 3: inhale quickly, hold 3 seconds, exhale quickly. Notice the quick action of the diaphragm.
3. The two blowing exercises, first rapidly then slowly, may now be taken. Assume the attitude of blowing away feathers.
4. Blow out slowly, during five seconds; later increase to 10 seconds.

   If the pupils are encouraged to make remarks regarding their attempts, it will prove more interesting. These exercises may be varied by accompanying them by arm movements, etc.
5. Relaxation.
6. " How many of you want to try the breathing exercises alone? (factor of competition useful)
7. Whispering. Repeat the first exercise, breathing in slowly, then whispering ah. Make it soft and clear; no tenseness or constriction. Then give the exercise 3, 4, or 5 whispered ah's on one breath. Notice movement of diaphragm.

3. Object: change of Pitch introduced, rising inflection. Definite response expected from the child.

1. Relaxation.
2. Review some of breathing exercises. Call attention to erect position, etc.

3. "Now we are going up a hill—make our voice go up too. Deep breath, hold, give ah with rising inflection.
   Several sounds may be given, awe, oo, ah, a, ee. Pupils may take turns, giving any one sound. This may be done in order, or the teacher may indicate the pupil who is to respond. (This is the first step in giving the pupil confidence in replying, the responsibility of choosing an answer rests with the pupil.) He must not be discouraged if he fails to gain a great range. This will come only with practice.
4. "Let's try the same with counting." Breathe slowly, hold, count 1, upward inflection. Repeat to 10.
5. Relaxation—make a game of this, but be firm in expecting results.
6. Repeat a few vowels slowly with rising inflection. Then count to 10, also backward to 1. Emphasize correct breathing, etc. Encourage practice of deep, quiet breathing before attempting to answer. Alternate exercises.

4. Object: to gain downward inflection.
   1. Repeat lesson 3, working for downward inflection. Use any of the exercises given, so far. For clearness and interest use any figure of speech which will convey the idea to the child.
   2. Often let the class choose the exercise to be worked on.

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                        ee r
Count from    e  t     r   u
            n   w   h   o
  1 to 10  o     o  t  f         Vary inflection.
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   3. Count to 10 upward inflection, back to 1 downward inflection.

5. Object: to give confidence in the power of the voice to rise and fall. To give vowels more clearly.
   1. Review some exercises in breathing; upward and downward inflection and counting.
   2. Relaxation.
   3. Explain the desirability of improving vowels, in order to be more easily understood, and to make the words firmer. Note any mistakes such as lips closed too tightly, muffled sounds and so forth. Write back vowels on board. Encourage individual efforts. (a) Give slowly on one breath. (b) Glide from one to another. (c) Give several vowels on one breath. Avoid any tendency to give them in a monotone.

6. Object: Review principles of breathing, inflection, etc. Confidence in naming objects.
    1. Recall some of previous lessons. "Do you remember how we counted to 10? Can you give these vowels as we did?"
    2. Write all vowels on the board. Try both upward and downward inflection.
    3. Relaxation.
    4. Now, when I point to objects I want you to name it as tho' you were giving a vowel. (Have pupils listen to change in voices, and avoid constant repetition of same inflection. Point to all objects in the room, parts of the body, and persons.)
    5. Have another pupil point out things. The same may be done in regard to colors.
    6. Alternate other exercises.
7. Object: tone production. Inflection.
    1. Review vowels, repeating after teacher. Name some objects.
    2. Breathing Exercises.
    3. Relaxation.
    4. Explain change of inflection in counting. Indicate by use of dashes. Try downward inflection. Vary exercise by using both inflections with numbers, 1-5. Encourage pupil in giving any of his own. If good, have them repeated by the class.
    5. Do the same with vowels, first using one vowel; then changing the vowel each time.
    6. Now give "Jack and Jill," indicating inflection by dashes; drawing pictures, etc, will stimulate interest. Have the pupils recite together and individually.
8. Object: breathing; inflection, phrasing, rhythm.
    1. Emphasize these points perhaps not in the exact terms in "Jack and Jill." Repeat several times. (Let some child draw pictures.)
    2. Relaxation.
    3. Counting 1-10.
    4. Name objects pointed to.
    5. Breathing, slowly, counting to 10 while exhaling.
    6. Alternate any of these exercises.

From these few sample lessons, one may gain an idea of how necessary it is to work deliberately, carefully and interestingly over each step of the course. It will be seen that almost every lesson dwells on several points in our plan of vocal training. It will be found well to call the attention of the class to one or two definite points in each lesson. " Now, we are going to work on phrasing," or "Today I am going to see how many of you can remember to breathe correctly especially when you answer me," or "This is the day we are to make every vowel we use just as clear and pure as possible."

About this time, if certain pupils have complained that it was hard to give a certain consonant, I would show them how to make it, just what the muscles had to do: take P, for instance. " Just open the lips quickly when you are ready to say it." I might if necessary try Dr. Ash's plan of classifying sounds.

So, far, the outline shows how various exercises may be introduced in grade of their difficulty. But every lesson is used to carry out the general demands of vocal training, and each should contain a few exercises on some of these fundamental steps in vocal reeducation.

Just a suggestion of the various exercises adaptable for class use:

1. Vowel Drills
   (a) Given alone, (b) given in combinations gliding from one to the other; (c) lists of words containing a specified vowel may be volunteered by class.
2. Consonant Drill.
   Similar drills as those for vowels, perhaps some explanation as to their formation.
3. Drill on words:
   (a) Name classified lists as birds, animals, plants, trees, flowers, books, articles of furniture, of food, etc.
   (b) Name things which are tall, short, heavy, pretty, good to eat, good to play with, etc.
   (c) Give association words as an exercise for prompt response.
4. Questions and Answers; (by either pupil or teacher)
   (a) Who? How? When? Where? Why? Did? Can? How many? In what direction? How long?
5. Descriptions:
   (a) Simple articles. (b) rooms; (c) persons; (d) designs, symbols, etc. (e) pictures.
6. Numbers.
   (a) Read numbers; (b) make out grocery bills, etc.

7. Comparison.
   (a) of articles, (b) of people; (c) of buildings, etc.
8. Directions; have pupil give them.
   (a) to go somewhere; (b) to do something, etc.
9. Reading.
   (a) In unison; (b) alone; (c) reproduce stories; (d) original stories.
10. Miscellaneous.
    (a) Any conversational game; (b) dialogues; (c) riddles; (d) short stories; (e) short autobiographies; (f) relation of events; (g) travel talks; etc.

AN EXPERIMENT IN THE TEACHING OF ELECTRIC WIRING

By **Robert Van Allen**, Murray Hill Vocational School, New York

Enough has been written on what ought to be done in education. More important at this time are (1) what to teach, (2) how to teach, and (3) when to teach it. Assuming what to teach. the writer has attempted a partial answer to the second problem—how to teach it. Educators have too long been satisfied with basing their work on what has been done and on theoretical speculations of what ought to be done. The aim of this article is to give briefly an account of some preliminary work done in an attempt to discover what can be done in the presentation of the problems involved in electric wiring from the standpoint of economy and technique of learning.

Concentration of industry, the use of large capital, the employment of machine tools, and the organization of modern industry resulting in present competitive methods brought about the rapid decline of the apprenticeship system. The efficiency of this system depends upon the personal relation between the teacher and the taught. In modern times the relations between employer and employe are mostly determined by technical considerations. Sharp competition in business has left little time or desire on the part of employer to instruct apprentices. The learner has, therefore, been compelled to shift for himself and to "pick up" his trade as best he may. The employer, moreover, has come to feel that in training apprentices he may be doing so for the benefit of rival firms. He therefore considers it more advantageous to offer sufficient inducement to obtain the journeyman trained by others. The high degree of specialization, or division of labor, in the industries also works against the training of apprentices on the part of employers. An apprentice could, of course, after the completion of one specialty take up others. But this he is not likely to do, because the change would mean a decrease in wage. The industries in consequence are suffering from a great dearth of skilled labor. Comparatively few workmen can make or understand a working drawing and still fewer possess the ability to express their ideas on paper by means of suitable sketches.

The solution of the apprenticeship problem is the establishment of vocational schools. In the nature of the case, no school can take the place of the actual shop; but what can be done is to make the school as close an approximation to it as possible. The graduate can not be made a trained mechanic, but he can be made an individual trained to become a mechanic of more than ordinary ability.

In the teaching of electric writing and installation, schools in the past have attempted to give their students a knowledge of the subject by having them lay out the work of the trade in a schematic form on panel boards. Some feeble attempts have been made along the line of using miniature houses. The writer has attempted to bring the real work of the trade to his pupils by the actual construction of a building differing not in kind but only in size to that on which his students will work when they leave school. A brief description will make clearer the work being done.

The pupils procured studding, laths, and other material from a building that was being wrecked. With this material a two-story seven-room house was constructed in one of the shops. The rooms average four by five feet by six feet high. Every problem that confronts the mechanic in installing electric wires in a building is given the pupil in this practice house. According to the layout given him, he installs cables and the various types of electric light wiring for finished and unfinished buildings. These include knob and tube work, cleat work, metal molding, condulet, BX cable, Greenfield tubing, and exposed and concealed loricated conduit work. Panel boards, ceiling outlets in decorative designs, and switch and base receptable outlets are inserted in unfinished rooms and also in finished rooms, necessitating practice in carefully taking up flooring, removing base-boards, and cutting into plastered walls. That his course may be complete, the student is required to install, in addition to bells, push-buttons, annunicators, and door opener, the many devices and instruments employed in fire, burglar alarm, and telephone systems.

It is the purpose of the writer to take two groups of students as nearly equal in all respects as it is possible to get them; and to have one group use the old panel board method of learning, while the other group works out the same problems by means of actual work on the constructed house. The writer will control conditions so as to be able to measure quantitatively the merits of the two methods of teaching from the standpoint of economy of time and energy and thus be in a position to make a contribution of scientific validity to education.

BOOK REVIEWS

Johann Gottfried Herder as an Educator. By J. Mace Andress. New York, G. E. Stechert & Co., 1916. 316 p.

This book gives an interesting account of the life of Herder, the German educator of the last half of the eighteenth century, a transition time in which the foundations of the Germany of to-day were beginning to be laid. Early in the period we see the lack of national unity, the deplorable social conditions, the medieval notions of acceptance and obedience being reflected in education and in other phases of national life. In the midst of the passing to better things lived Herder, the spokesman of his time.

Dr. Andress has marked the steps of this progress: Rationalism,—the *Aufklärung,*—the growing liberty of thought and freedom of expression, but with a too unlimited confidence in reason as such; the Realism of Comenius and Locke with the impetus given by Rousseau, reaching Herder and his contemporaries, Basedow and Pestalozzi, marking the passing from the theological to the secular and to the study of science and philosophy in the universities.

All this led to the New Humanism, for which Herder stood, and which infused a still more liberal spirit into life, emancipating it from deep-seated prejudice and the worship of tradition; thus there resulted a more democratic educational ideal, the emphasis being shifted from form to content; it now appeared to be the privilege and the duty of every man to fully realize the possibilities of his nature. Then came the fruit of this flowering, the spirit of Romanticism, in which was manifested man's wealth of divine emotions, and which led the way to the study of Nature and to an era of Art, Music and Poetry. Thus Herder's life was set in the midst of many interests which had had their day and the rise of others which were to have a shaping influence in the national life.

As the writer has shown us, only recently have we realized that theories and practices of education are but superficially understood unless seen in the light of universal history; this perspective brings men who have seemingly had little influence upon education into new prominence. Thus it was with Herder, whom most texts on the History of Education fail to mention; his name suggests rather the preacher and the man of letters; besides he has given us no coherent and systematic work on Pedagogy, like Rousseau's "Emile"; what he wrote on education seemed to be the overflow from his other lines of thinking; just as a poet may give scientific, political or social problems a literary value, so Herder in all his writings assumed the attitude of the educator.

The book gives us a graphic picture of Herder's life: the son of a school-master, under the dogmatic pedagogue, Grimm, tyrant and pedant, standing for all that Herder hated in a teacher, at the same time being a favorite of the man who awakened in him a passion for reading and a desire to learn. Later he became the copyist of a curate, morbid and pious; but he, too, stimulated Herder to further study and thought. Then he entered the University of Königsberg for theological training, where he was made inspector in a boy's school. Here he first met Kant, who was then a lecturer in the University, whom he later regarded with the greatest gratitude and respect; he was especially impressed with Kant's idea that man as a natural being was dependent on his natural surroundings, and that in these he must reach his highest development. Thus early in life and with some sense of satisfaction he found himself a teacher with a born passion for imparting knowledge. In Riga, his next field of work, he found an atmosphere commercial rather than scholarly; but to his delight its spirit was opposed to the conventional education of the day.

His Wanderjahre of two years took him to Nantes, Paris, Hamburg, Strassburg,—a kind of Faust, he says of himself, wandering about in search of experience, having become weary of books. During this time he met Goethe, later his intimate friend, who said of him, "Herder is the sworn foe of all sham and ostentation." He proved to be one of the great inspirations of Goethe's life and work. In Weimar, where he later became Superintendent of Schools, was written his most important book, "Ideas on the Philosophy of History," which treats of the evolution of man, and the methods of the scientist before such study was vital in education. He died in Weimar in 1803.

In the ordinary use of the word Herder would not perhaps be regarded as an educator; he had no direct influence on methods of teaching, and his general theories on the subject are to be found largely in writings which suggest little relation to Pedagogy. But Dr. Andress makes the reader feel that this term in its broadest sense applies to Herder. He was identified with all the forward movements of his day; he was among the first to recognize that education is conditioned by the other great forces of civilization; and, while his ideas were not revolutionary, he led the way to the goal where everything was pointing. He stood for principles in education which are fundamental; he was a pioneer in the genetic method of study; he even realized the fatal propensity among educators to become the "victims of formulae." No learning, he said, is of permanent value which does not involve the self-activity of the individual. Health is the basis of happiness, and usefulness; but a mere knowledge of its laws will not insure it. Everybody carries within himself the forms in accordance with which he can be happy. Culture grows out of one's nature; it is indigenous, not a graft; thus every people should make the most of its vernacular; thus, too, wars of conquest are incompatible with human welfare, the national glory resting on such a basis being a mockery.

All this suggests his influence among his own people; but it reached beyond these limits; in France Guizot, De Tocqueville, Renan, and Taine were indebted to him; and in England Burke, Carlyle, Darwin and Coleridge were also his disciples. These names link him to our times, such being the significance of all history,—the eliminating what has done its work and the passing on what still has vitality for the future.

The human side of Herder has been well brought out, which serves to emphasize his greatness, at the same time bringing him nearer to the reader: the melancholy which pervaded his life, the jealousy of his colleagues, the irksomeness of his official duties, his distress at Goethe's seeming neglect, his refusal to wear a wig for dignity's sake because his own hair was cheaper, his fear of being called to war, his finding nobody with whom he cared to associate or who cared to associate with him, his last days burdened by his blindness, with most of his friends alienated; but none of all this appears in his writings; and the words Life, Love, Light, which are inscribed on his tombstone seem fitting words to commemorate this great preacher and teacher of humanity.

E. W. Flagg.

The school nurse. A survey of the duties and responsibilities of the nurse in the maintenance of health and physical perfection and the prevention of disease among school children. By Lina Rogers Struthers, R. N. New York, G. P. Putnam's Sons, 1917. 293 p.

The author states in the preface that this book is written for school nurses, "in the hope that it may contain suggestions and directions that will be of material assistance to them."

The first part is historical. It is pointed out that medical supervision of schools has passed through three phases. First, the child with a communicable disease was merely excluded from school, but there was nothing to keep him from mingling with the other children outside of school hours. With the advent of the school nurse, there came the policy of cure, and school attendance increased fifty per cent. At last has come the policy of prevention, with school clinics, instruction in hygiene, and other constructive measures. Her account of the difficulties under which the school nurse worked in the beginning of the movement is particularly interesting. In striking contrast with these is the present status of school nursing, which is given in detail, not only for the different cities in this country, but for the more important ones of Canada and Europe.

The heart of the book is the part devoted to the actual work of the school nurse. The organization of her work is the first problem and her programs must be so arranged that she can make regular visits to the different schools. In rural districts, three to six schools should be the maximum, and in cities the number of pupils under her care may vary from 500 to 2000. Detailed instructions are given for examining the children and treating the minor troubles, lists of which are given and remedies suggested. Teeth-washing and nose-blowing drills, outdoor classes and schools, the selection and care of the tooth brush, and many other such particular topics are discussed in a plain and simple but very detailed way. Even such details as the construction of the school medicine or supply cabinet and what it should contain are given. A complete chapter is devoted to the subject of Little Mothers' Classes, giving their history and an outline of how they should be organized and conducted.

Closely associated with the discussion of the nurse's work is the treatment of what might be called the legal aspects. For example she outlines the duties of the Board of Education and those of the Board of Health and explains which has jurisdiction in certain cases. The discussion is broadened out to include suggestions for legislation or local regulations and advice for forming committees and various boards.

A section on children's diseases is one of the longest in the book. Much of the information here is valuable and interesting, but one would think that a graduate nurse would hardly need a good portion of it—or if she did, she would certainly need more than could be given in a small book like this.

One chapter is devoted to the qualifications of the nurse herself, and emphasis is laid on the necessity of neatness in attire, and sympathy and persistence in her work, especially in the home visiting. She explains that there are many things outside of her regular line which the nurse should know and ends the chapter with a discussion of some of the more common questions of school hygiene.

Throughout the book there are very frequent references to the manner of making out card index reports and records and at the end several pages are devoted to showing blank forms for these purposes.

This book was written for nurses and some parts will not appeal to the educator. But there is much that is of value to him, and taken as a whole the work gives a very satisfactory knowledge of the subject of school nursing.

McKendree College. RAYMOND BELLAMY.

Der Weltkrieg 1914-15 in der Volksschule. By FRANZISKA PEIL. Paderborn, Ferdinand Schöningh, 1915. 108 p.

In the third edition of this little book designed for instruction in the Peoples Schools the author gives an account of the causes of the great war and also a history of the war for the months of July, August, September and October; and this third edition is further improved, in the opinion of the author, by a thorough elimination of foreign words. Besides this are added sections on the war in instruction in the different subjects—religon, German, history, geography, and the rest.

It seems a pity that the German youth should lose the rich humor of this textbook. The author states the deeper causes of the war in rather moderate fashion, but the special humor of the production lies in the account of the battles of the war, which one suspects is naïve quite as much as mendacious.

Several pages are devoted to the conquest of Belgium, then the statement is made that on the 4th of September Rheims fell into the hands of the Germans without battle because evacuated by its garrison. The author gives the description of the epoch making events of the next week as follows: "Unmolested our army passed over the Marne. Here finally it fell upon the enemy. At the line of the Meaux-Vitry (Sept. 10) violent stubborn fighting occurred. The left wing of the French army endeavored to surround our right wing. Then the latter was bent back. The line of battle was now transferred to the Aisne. (Thus Rheims came again into the possession of the French.) Here the Germans established tremendous earth fortifications."

Such is the remarkable description of the great epoch making battle of the Marne, when Germany was driven back and thoroughly defeated, lost perhaps 150,000 men, and gave up eight of the eleven departments of France invaded by her armies. The author caps the climax by his résumé of the great events of the war which is in part as follows:

Aug. 26. The fall of Namur.

Aug. 27. Great defeat of the French and Belgian troops near Namur.

Sept. 28. The first attacks on the outer forts of Antwerp occurred.

This amazing summary is only equaled by the map showing the position of the German troops during the period of this French invasion. On the 10th of September, the day on which the Germans were thoroughly defeated, their battle line is represented as nearer to Paris than ever before. Certainly it would be difficult in the best pages of *Fliegende Blätter* to find anything more humorous than this. W. H. B.

BOOK NOTES

The exceptional child. By MAXIMILIAN P. E. GROSZMANN. New York, Charles Scribner's Sons (c. 1917). 764 p.

The author uses the term "exceptional" in the broadeest sense, and after the usual preliminary chapter on The Educational Problem in General, takes up in successive chapters, Efficiency, Different Civilization Levels in Modern Society, Classification and Terminology, Normal and Potentially Normal Children, Exceptionally Bright Children, Psychopathic Disorders and Psychopathic Constitutions, The Feeble-Minded Group, Juvenile Delinquency, and Sexual Perversion and Prostitution. So much under The Problem of the Individual Child. In Part II, under The Problem of Clinical Research and Diagnosis, are treated The Determination of Exceptional Development in Children, Standardization, Binet Scale, Meaning of an Educational Clinic, and A Schedule of Tests. Part III deals with Prevention, Adjustment, and Organization, and under this, Legal Provisions for Exceptional Children, Eugenic Considerations, Marriage, and Heredity. Home Life and Education, School Problems, the Kindergarten Period, General Provisions for Variation from Type, Provisions for the Exceptional Child in School and Institutions, The Sanatorium Schools for Atypical Children, and Teacher-Training. In an appendix come The City and Her Boys, and A Medical Symposium. As will be seen from this outline, the work is extensive and valuable. The author has done well to bring together the results of his own study and experience in this systematic form. Our criticism would be that there is too much in it that pertains to his own institution and methods, and too little account of what is being done elsewhere. It is singular, too, that in his bibliography of over twenty pages he has drawn on almost nothing but English sources, when so much and excellent work has been done in Europe.

Fifty years of American education; a sketch of the progress of education in the United States from 1867 to 1917. By ERNEST CARROLL MOORE. Boston, Ginn and Co. (c. 1917). 96 p.

The three chapters are entitled. We Live in a Period of Change; Education to the End of the Civil War; and, Some Changes since the Civil War. There is a brief bibliography of some fifteen titles appended. It is a pity that with the data available we could not have had something that comes down more to recent times. Some readers will be struck with the remark about "John Dewey's discovery that real education is and must be based upon the nature of the child." How can this be called a "discovery" when it goes back to Froebel, Rousseau, Pestalozzi, not to say to Comenius; and valuable as Dewey's work is, what did he do toward this "discovery"? The impression that this book makes is that it was written as a kind of perfunctory "job," especially Chapter three. There is a great opportunity for a splendid piece of work here but this author has certainly sidestepped it, and his bibliography suggests that he is not acquainted with the best literature upon the subject, particularly, again, in the third chapter.

The teaching of economics in Harvard University; a report presented by the Division of Education at the request of the Department of Economics. Cambridge, Harvard University Press, 1917. 248 p.

This is the complete report presented to the department of Economics and the President in September, 1916. It has been somewhat revised and is published with the conviction that its problems and methods and conclusions are of interest to college teachers not only of Economics but of other subjects outside of Harvard. It is signed by Professors Hanus, Johnson, Moore, Dearborn, Inglis, Brewer, and Holmes. It deals with the inspection as a whole, aims in the teaching of economics, quantitative studies from students' records—studies in correlation. minor studies and proposals for experiments, the questionnaire method, marking, summary of conclusions and recommendations, and supplements.

Neurosyphilis; modern systematic diagnosis and treatment. By E. E. SOUTHARD AND H. C. SOLOMON. Boston, W. M. Leonard, 1917. 496 p.

This book presents the subject of diagnosis and treatment of neurosyphilis in the form of one hundred and thirty-seven case histories. It is written primarily for the general practitioner and at the end has a chapter entitled "Summary and Key." Fourteen of these cases are selected from British, French, and German writers, to illustrate the war. The lessons of the book are summed up in three propositions: 1. the unity in variety of the phenomena of the diseases; 2. the value of hopeful approach to all, even the paretic forms; and 3. the value of applying syphilitic tests to every case of neurosis or psychosis.

A theology for the social gospel. By WALTER RAUSCHENBUSCH. New York, Macmillan Company, 1917. 279 p.

This is an elaboration of the author's lectures in April, 1917, on the Taylor Foundation at the Yale School of Religion, which lectures are supposed to deal with some theme in doctrinal theology, so the author opens up with a challenge of the social gospel to theology, and then treats of the difficulties of theological readjustment, tells us that it is something neither alien nor novel, deals with the consciousness of sin, the fall of man, the nature and transmission of sin, the superpersonal forces of evil, its kingdom, the social gospel and personal salvation, and that of the superpersonal forces, their relation to the church, the kingdom of God and its initiator, the relation of the social gospel to the idea of God, Holy Spirit, revelation, inspiration and prophecy, baptism, and the Lord's Supper, eschatology, the atonement.

A parent's job. By COLUMBUS N. MILLARD. Boston, Pilgrim Press, (c. 1917). 227 p.

The chapter headings in this book are as follows: Slipping Responsibility on the Schools; Displacing the Idol of Percentages; Habits of Address that Home and School Should Co-operate to Form; Habits of Work that are Essential to Efficiency; Some Essential Habits of Character; Health Habits that Are Vital to Efficient Living; Home Education Prior to Entering School; The First Three Grades of School; Home Co-operation in the Fourth, Fifth and Sixth Years of School; Co-operation in the Seventh and Eighth Grades, and in First Year High School; National Preparedness.

Religious education and American democracy. By WALTER SCOTT ATHEARN. Boston, Pilgrim Press (c. 1917). 394 p.

To make the world safe for democracy demands intelligence and Godliness. The first chapter outlines the system of public schools which the state is building and also a system which the author believes the church should build if intelligence is to be complemented with Godliness. The attempt is to develop a constructive program of religious education for the American people, to analyze existing agencies, to determine our present assets and liabilities, and to survey available literature. The writer believes our great problem is to develop such a course.

Numenius of Apamea, the father of Neo-Platonism; works, biography, message, sources, and influcnce. By KENNETH SYLVAN GUTHRIE. Grantwood, N. J., Comparative Literature Press, (c. 1917). 215 p.

This is a scholarly work, first giving an account of the author's treatise on the good, including practical questions, theological metaphysics and allegoric exposition by comparative religion. The fourth book is no longer extant. Then follow, in succcssive books, philosophical theology, spiritual interpretations, the mystery-teachings of Plato, the Hoppoe, the bird of prognostication, the indestructibility of the soul, space, number, Timeaeus, and history of the successors of Plato.

Kinderstudie; Paedologische Bladen. November, 1917. Vol. II, No. 2.

This journal devotes five pages to the article by L. C. Day, entitled "A Small Boy's Newspapers and the Evolution of a Social Conscience (Pedagogical Seminary, June, 1917, Vol. 24, No. 2); nearly five more to the same author's "The Child God" (Pedagogical Seminary, September, 1914, Vol. 21, No. 3); two pages to his "Alphabet Friendships" (Pedagogical Seminary, September, 1914, Vol. 21, No. 3); and five and a half pages to J. K. Folsom's "The Scientific Play World of a Child" (Pedagogical Seminary, June, 1915, Vol. 22, No. 2).

Handicaps of childhood. By H. ADDINGTON BRUCE. New York, Dodd, Mead and Co., 1917. 310 p.

This is partly a reprint of articles printed in magazines, but they are interesting and it is well to have them printed together. The ten topics and chapters are as follows: Mental Backwardness; The Only Child; The Child Who Sulks; Jealousy; Selfishness; Bashfulness and Indecision; Stammering; Fairy Tales That Handicap; "Night Terrors"; In Conclusion.

Education according to some modern masters. By CHARLES FRANKLIN THWING. New York, Platt and Peck Co. (c. 1916). 296 p.

This book consists of lectures on Emerson, Carlyle, Ruskin, Stuart Mill, Gladstone, Arnold, J. H. Newman and Goethe, with a summary and conclusions.

The seven laws of teaching. By JOHN M. GREGORY. New edition. Revised by William C. Bagley and Warren K. Layton. Boston, Pilgrim Press (c. 1917). 129 p.

There is the law of the teacher, the learner, the language, the lesson, the teaching process, the learning process, and of the review and application; these are the chapter headings.

Bugle calls of liberty; our national reader of patriotism. By GERTRUDE VAN DUYN SOUTHWORTH AND PAUL MAYO PAINE. Syracuse, Iroquois Pub. Co., (c. 1917). 179 p.

This is an admirable selection of some thirty articles or orations by prominent men, bearing on patriotism, Patrick Henry, Paul Revere's ride, the Declaration of Independence, the Liberty Bell, America, Lincoln's Gettysburg address, Barbara Frietchie, down to Wilson's message, with the Constitution of the United States as an appendix. The book is illustrated with some two dozen cuts.

American patriotic prose. By AUGUSTUS WHITE LONG. Boston, D. C. Heath and Co. (c. 1917). 389 p.

This is a book of selections on ten topics, such as The Streams of American Life, The Colonies, Independence Developed, The Declaration, Washington, Struggle and Growth, Division and Reunion, Gallant Youth, Responsibility, and Opportunity.

The use of motives in teaching morals and religion. By THOMAS WALTON GALLOWAY. Boston, Pilgrim Press (c. 1917). 187 p.

This treats educational methods in religious education, some principles applied in general which must be applied in religious education, essential natural elements, principle of motivation, study of natural motives, form of expressive work suitable to Sunday Schools, etc.

Stories for any day. By CAROLYN SHERWIN BAILEY. Boston, Pilgrim Press, (c. 1917). 163 p.

This book assumes that the story every child loves best is one about family life, and so these tales are based upon true incidents that have been told countless times. They are brief and are said to offer new material of interest and ethical value. There are some thirty-five of these tales.

Beginning Latin Book. By ALBERT S. PERKINS. Chicago, Benj. H. Sanborn and Co., (c. 1918). 432 p.

This book is based on the idea that Latin originals should be correlated with English derivatives; correlation with written matter is given, and there is practice in the direct method. One excellent feature of the book is the many illustrations it contains. There are references not only to literature but three Latin songs are printed.

Spontaneous activity in education. By MARIA MONTESSORI. Tr. from the Italian by Florence Simmonds. New York, Frederick A. Stokes Co., (c. 1917). 355 p.

This is a very valuable work, and every teacher will be glad to see it in English dress. The chapter headings are, A Survey of the Child's Life, A Survey of Modern Education, My Contribution to Experimental Science, The Preparation of the Teacher, Environment, Attention, Will, Intelligence, and Imagination.

The Montessori elementary material. By MARIA MONTESSORI. Tr. from the Italian by Arthur Livingston. New York, Frederick A. Stokes Co., (c. 1917). 464 p.

This book describes the Montessori conclusions in regard to the teaching of grammar, reading, arithmetic, geometry, drawing, music, and metrics.

The University of the State of New York prints five little booklets under the general term of Higher Education, devoted to the following topics: Medicine; Chiropody; Veterinary Medicine and Surgery; Certified Public Accountants; Certified Shorthand Reporters. They are essentially law books.

Studies in higher education in Ireland and Wales, with suggestions for universities and colleges in the United States. By GEORGE EDWIN MACLEAN. Bureau of Education Bulletin, 1917, No. 15. Washington, Government Printing Office, 1917. 118 p.

Report of a survey of the University of Nevada. Bureau of Education Bulletin, 1917, No. 19. Washington, Government Printing Office, 1917. 184 p.

Practice teaching for teachers in secondary schools. Bureau of Education Bulletin, 1917, No. 29. Washington, Government Printing Office, 1917. 82 p.

A study of organization and method of the course of study in agriculture in secondary schools. By THEODORE HILDRETH EATON. New York, Teachers College, 1917. 183 p.

The organization of instruction materials, with special relation to the elementary school curriculum. By J. W. HECKERT. New York, Teachers College, 1917. 107 p.

NOTICE TO READERS

Until the close of the war, the size of the PEDAGOGICAL SEMINARY will be reduced twenty or twenty-five pages per number, making a volume of about five hundred pages.

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OLD AND YOUNG TEACHERS

HELEN M. DOWNEY

In 1903 Dr. G. Stanley Hall, issued the following questionnaire:

I. State characteristic differences between very young and very old teachers of any grade from kindergarten to university.

II. Would you establish age limits either way and, if so, what and why?

III. What are the effects of continuous teaching on the different sexes in (a) health, (b) temper, (c) devotion to methods, (d) open-mindedness and readiness to accept and adopt new ideas?

IV. What physical, mental, and moral idiosyncrasies tend to increase with age?

V. Do older teachers tend to lose contact and sympathy with children or young people?

VI. Nature provides that parents of 25-35 years more easily adjust to younger children than those of 40-50 years. Can older teachers fit more readily the nature and needs of older children, and vice-versa, irrespective of increased mental attainment?

VII. Mere age and years bring an unique psychic development apart from increase in learning. Does this tend to qualify or disqualify schoolwork with any age or grade of childhood, or is there a "teaching age"?

VIII. Describe as fully as you can a typical male or female teacher of mature years who has steadily grown in knowledge and power.

IX. Describe a typical teacher of mature age who has long since ceased to grow, but has become stereotyped in opinion and method, prejudiced, and neophobiac, and illustrate the bad effect of teaching.

X. List a few suggestions to aid teachers in conserving the period of rapid growth and in avoiding the evil of monotony repetition, routine and mechanism.

The returns were carefully tabulated by Miss Louise Gulick, a fact which has largely made this paper possible. One normal school furnished a great part of the replies—about eighty papers—to questions I, VIII, and IX.

Two hundred thirty-one answers were received to question number I, " State characteristic differences between very young and very old teachers of any grade from kindergarten to university." The positive and negative qualities mentioned may be tabulated thus:

Positive Qualities

	Young Teachers	No. of replies	Old Teachers	No. of replies
a.	More enthusiasm, animation, and interest in work	60	More interest in work	2
b.	More ambitious, active, progressive, and amenable to suggestion	59	Have purpose and intelligence to plan interesting work	32
c.	More sympathy with, and better liked by pupils	75	More sympathy with and better liked by pupils	6
d.	More up to date. Methods better	25	More experienced, using more practical, and better methods	64
e.			More knowledge of human nature especially of children	31
f.			Better knowledge of subject matter	22
g.			More conservative and stable	10
h.			Inspire confidence and respect	6
i.	Attend details of work better	1	Attend details of work better	12
j.	More patient	11	More patient	11
k.	More cheerful	6		

Negative Qualities

	Young Teachers	No. of replies	Old Teachers	No. of replies
l.			Set in opinion, fixed in method, resent suggestions for improvement	131
m.	Exacting, cross, demands unreasonable, over-strict	37	Exacting, cross, cranky, sarcastic, unreasonable in demands, too strict	39
n.	Lacking in self-confidence, nervous, worry, upset by trifles	64	Nervous, upset by trifles	9

NEGATIVE QUALITIES—*Continued*

Young Teachers	No. of replies	Old Teachers	No. of replies
o. Vacillating in method, obliged to experiment.	58		
p. Poor disciplinarians	59	Lax, easily "worked," poor disciplinarians	26
q. Plan ineffectively through uncertainty about purposes of teaching	19		
r. Frivolous, not serious....	15		
s. Do not study individuals	3	Do not study individual pupils	2
t. Less ready to acknowledge mistakes	1	Less ready to admit errors..	3
u. Self-satisfied, conceited...	1	Self-satisfied, conceited	6
v.		Personally unattractive, oddities of dress and manners	11
w. More likely to be partial..	1	More likely to show partiality	1

The above table attributes to very young teachers two hundred and thirty-seven mentions of positive qualities, and two hundred and fifty-eight for negative qualities, while the very old teachers are credited with one hundred and ninety-six answers for positive, and two hundred and twenty-eight for negative qualities. Both young and old are invested, therefore, more often with negative than with positive qualities and youth has listed both positive and negative slightly more frequently than has age, suggesting that both favorable and unfavorable traits are more marked in youth than in age.

A Few of the Replies to Question I

F. 19. The young teacher has other interests which keep her bright and cheerful and she brings this into the school-room, while an old teacher usually has some care which shows itself and influences the school-room.

F. 23. Young teachers are often very enthusiastic without being practical. They become enthusiastic over some idea and strive to carry it out whether conditions are favorable to it or not. Older teachers do more planning. They do not rush headlong into a matter until they have decided that the act is a wise one and until they feel sure of good results.

Very young teachers are apt to judge from outside appearances, while an older teacher searches the matter out and forces no conclusions until she is certain of the causes of an act.

Young teachers lose their tempers and become nervous at little things. Older teachers have better power of control, because of experience.

Young teachers are very sympathetic and apt to be rather vacillating in their control of children. Sometimes they are so lenient that the children get the upper hand and in order to overcome this tendency they are over-strict for a few days and vice-versa.

F. 20. Two teachers, one about forty-five years of age, with twenty-two or twenty-four years of experience, the other, about twenty-five years of age with two years experience. The older teacher is physically unable to teach, yet she keeps going. She has order in her school because she rules with an iron rod. The children are held down to work with no freedom for individual action. They must act as a machine. She has for years taught by the same method, the same thing, and the children get no new ideas from her. All the life has been taken out of her by her years of work and she has no ambition to renew it. Older teachers are, as a rule, careless of appearance and this does not appeal to children.

The younger teacher is careful of appearance, bright, and entertaining, rules by love and kindness rather than by harsh treatment. She is nearer the age of the child itself and can enter into the plays and can more easily see things from the child's standpoint.

F. 40. Young teachers are more or less nervous during the first month of teaching, owing to lack of assurance in power to maintain order, etc.

Old teachers have self-assurance and consequently are not inclined to be nervous; at least from the standpoint of the young teacher.

Young teachers are more liable to over-tax their strength in the persistence of effort to bring pupils up to a given standard, than are old teachers, who are able to give to their effort a better direction with less outlay of nervous force. Experiences of life bring lessons which no amount of book-study brings.

Young teachers are not so likely to take into consideration individual characteristic of pupils as are old teachers.

Young teachers often enter into the spirit of play and fun more than old teachers, but not always.

For my own children, other things being equal, I prefer the old teacher to the young one.

The answers to question I fall quite naturally into three groups: the first includes those qualities attributed to very young teachers only; the second, those ascribed to very old teachers only; and the third, those qualities common to both very young and very old teachers.

According to these returns only the very young teacher is ambitious, active, progressive, amenable to suggestion, and cheerful, while the faults of the very youthful pedagogue, never ascribed to the very old ones, are vacillation of method and experimentation, ineffective planning through uncertainty of the purpose of teaching, frivolousness, lack of seriousness.

The very old teacher is endowed , exclusively, by these replies, with purpose and intelligence to plan interesting work, with more knowledge of subject-matter, conservativeness, stability, and ability to inspire respect and confidence; the negative qualities possessed by this group only are designated as setness in opinion, fixedness in method, resentment of suggestions for improvement, personal unattractiveness, and peculiarity of dress and manner.

The returns allowed the very young and the very old teachers to share, though by no means equally, in the other qualities mentioned. The very youthful instructor is said to show more interest in her pupils and to be more sympathetic with, and better liked by them. In these respects youth scores heavily over age which, however, shows some slight superiority in attending to details of the work. The crown of patience was awarded to neither as youth and age received equal honors in this as in the matter of being cross, exacting, unreasonable in demands, and over-strict. There were but negligible differences noted between them on points of studying the individual, readiness to acknowledge mistakes, display of partiality. Young teachers are found to be much more prone to lack of self-confidence, nervousness, worry and concern over trifles, and are rated substantially lower than old teachers as disciplinarians.

The major point of these answers is the startling indictment of the very old teacher for setness in method, fixedness in opinion, and resentment of suggestions for improvement which establishes a difference noted nearly twice as often as the next in numerical sequence, the more abounding sympathy and likability of the very young teacher.

This contrast leads to the question of the nature of the faults and the merits of both groups of teachers. Everyone is endowed with certain traits quite apart from capacity for work and aptitude in any line of endeavor and, on this basis, classification of the qualities of teachers—in so far as they can be judged from the material at hand—is possible. The former have to do with the disposition of the pedagogue, his relations and reactions to his pupils; the latter deal with his relations to his work, his mental attainments, handling of subject-matter of the class-room, method, etc.

For very young teachers the positive qualities, a, b, c, j, k, may be considered dispositional qualities, while d, and i, may be designated as mental qualities. Accordingly, 211 answers testify to the positive dispositional qualities of young teachers and twenty-six to their positive mental qualities.

For very old teachers a, c, g, h, and j, can be classed as positive dispositional qualities and we find that these are mentioned 35 times as against 161 citations of the positive mental qualities represented under b, d. e, f, i.

The deduction is, of course, that the merits of very young teachers lie in the realm of disposition as contrasted with those of very old teachers whose mental excellencies are preponderant.

Continuing this line of division into the section of the negative qualities, l, m, n, p, r, s, t, u, v, w, are dispositional and o, and q, are mental.

For dispositional failings the very young teacher is arraigned 181 times, for negative mental qualities seventy-seven times; two hundred and twenty-eight voices acclaim the negative dispositional qualities of the very old teacher who may, however, take some comfort in the fact that there was not even a faint murmur of accusation against him for shortcomings on the side of mental attainments.

Tabulated, this information assumes the following form:

	Very Young Teachers No. of Replies	Very Old Teachers No. of Replies
Positive Qualities		
1.) Dispositional	211	35
2.) Mental	26	161
Negative Qualities		
1.) Dispositional	181	228
2.) Mental	77	0

Thus the dispositional positive qualities of youth slightly overshadow its dispositional faults, but its negative mental qualities are noted nearly three times as frequently as its positive mental qualities.

For the very old teacher, however, the glory of his mental superiority is somewhat tarnished by his dispositional lapses which are mentioned nearly eight times as often as are the dispositional virtues of age.

Furthermore, on the basis of the above classification, the positive qualities monopolized by the very young teachers are dispositional, and three out of the five ascribed to the very old teachers are mental.

The negative qualities attributed solely to very young teachers are mental in two of the three points mentioned and those with which the very old teachers only are invested are both dispositional. Numerically the ratio for both positive and negative qualities of this sort is as follows:

TRAITS MONOPOLIZED BY VERY YOUNG AND BY VERY OLD TEACHERS

VERY YOUNG TEACHERS
Positive Qualities

		No. of Replies.
Dispositional	b)	59
	k)	6
		65

VERY OLD TEACHERS
Positive Qualities

		No. of Replies.
Mental	b)	32
	f)	22
	e)	31
		85
Dispositional	g)	10
	h)	6
		16

VERY YOUNG TEACHERS
Negative Qualities

Mental	q)	19
	o)	58
		77
Dispositional	r)	15

VERY OLD TEACHERS
Negative Qualities

Dispositional	l)	131
	v)	11
		142

The above indicates clearly that each group is isolated in the possession of certain dispositional merits and failings; but some negative mental qualities are thought characteristic of only very young teachers, while the very old teachers, exclusively, are invested with certain mental excellencies.

The two most notable deductions from this classification are that the pre-eminent weakness of the very young teacher rests predominantly in the domain of mental attainment, and that of the very old teacher in the realm of dispositional qualities, while the strength of the former is dispositional and that of the latter mental.

These figures are interesting from another point of view, also, as they suggest that dispositional qualities, either good or bad, are much more impressive than mental qualities of either sort. Six hundred and fifty-five answers noted dispositional qualities, but only two hundred and sixty-four mentioned mental qualities, praiseworthy or otherwise.

Since disposition leaves so deep an impression, and both very young and very old teachers are guilty of marked defects in this connection, the question arises as to whether there should be age limits for teaching and, if so, what and why.

Under topic II of the questionnaire this query received one hundred and sixty-five answers. Five were unwilling to decide, thirty-five answers were negative, and one hundred and twenty-five were affirmative.

AFFIRMATIVE REPLIES

	No. of Replies
No age limit stated	8

Lower Age-Limit	to Upper Age-Limit	No. of Replies
16 or 17 years	none	3
18	"	23
19	"	3
20	"	11
21	"	2
22	"	1
16	60	1
16	65	1
18	50	10
18	60	4
18	70	1
19	65	1
20	30	1
20	35	1
20	40	1
20	45	1
20	50	4
20	55	1
20	60	30
21	28	1
21	40	1
21	45	1
21	65	1
25	35	1
25	50	1

Women		Men		
Lower-Limit	to Upper-Limit	Lower-Limit	to Upper-Limit	No. of Replies
18	50	None	None	1
18	None	21	"	1
20	40	20	"	1
20	55	20	"	1
18	35	18	50	1
18	55	19	60	1

For Grades		Above the Grades		
18	40	None	None	2
19	45	"	"	1
19	35	"	"	1

Kindergarten and Primary		Grades and High School		University or College		
Lower Limit	Upper Limit	Lower Limit	Upper Limit	Lower Limit	Upper Limit	
17	23	25	40	40	55	1

Some Replies to Question II

F. 24. I do not think that a *rigid* age limit should be established. It might exclude some very excellent teachers and might discourage anyone from entering the profession, if he could not teach until he had reached a certain age.

M. 27. No maximum limit, because it will be difficult for an old teacher to get a position in the future unless he does keep up with the work and the times, and an old teacher that does keep up has better judgment and should be wiser in his administrations.

F. 21. I would establish age limits both ways, twenty-five years as a beginning, thirty years as quitting time. Usually five years of teaching wear a teacher out physically. I said from twenty-five to thirty because, at the present rate of living, a woman is at her best at this period of life.

M. 27. I would certainly establish age limits, but a far better criterion would be ability and disposition. Since, however, the profession of teaching is controlled by law, there should be a minimum age limit, and for the maximum let the district interested determine this.

Those who defined limits are grouped thus:

1.) Those who favored a lower, but no upper limit	51
2.) Those who favored both an upper, and a lower limit	63
3.) Those who thought that men and women should have different limits	6
4.) Those who based the age-limit requirement on the age of the pupils taught	5

Reasons Given for Affirmative

Unfavorable characteristics of very old and of very young teachers, as noted under topic I. (The number of replies to this effect were omitted in Miss Gulick's tabulation, but she said elsewhere that these furnished the greater number of reasons.)

If teaching is begun, there is danger of becoming old in character and health before one's time	5
Seven to ten years of teaching wear a person out	2
There is an over-supply of over-young teachers	1

Negative Replies

	No. of Replies
Negative replies	35

Reasons for Negative Replies

Individuals differ too greatly	25
Some of our best teachers are above the age at which most teachers should retire	9
A really good teacher retains her ability even in old age	4

Universities need their older teachers to continue their own researches	1
Young teachers must support themselves	1
Old teachers would find it difficult to get other occupation	1
Limit is not needed, for unfit teachers will not get positions in an over-crowded profession	1
There should be a health requirement, not an age requirement	1
Teachers seldom do begin too soon, and usually stop too soon, anyway	1
There should be a higher all round requirement	1
People would not enter the profession if they did not enter young	1

Since the majority of the replies stated that there should be age-limits, determination of the most favored upper and lower ones may be based on the following table of totals:

Lower Limit	No. of Replies
None	5
16 or 17 yrs.	6
18	45
19	5
20	52
21	6
22	1
25 (including 1 for grades and high school.)	3
40 (for college and university)	1

Upper Limit	No. of Replies
None	51
23 (kindergarten)	1
28	1
30	1
35	4
40 (including 1 for grades and high school)	6
45	3
50	17
55 (including 1 for university)	4
60	36
65	3
70	1

Accordingly, the advisable lower limit is twenty, or possibly eighteen, and the proper upper limit, if any, is sixty years. The favorite span noted is very markedly twenty to sixty years.

Miss Gulick, who had access to all of the returns, says, "That the matter is largely individualistic, nearly everyone agreed who had comments to make. The reasons for establishing age-limits were mainly references to the negative characteristics mentioned in the foregoing tables with especial reference to the fact that these qualities become fixed with age.

"Those who negatived a teaching age argued that some of our very best teachers are those who are over the 'retiring age' of fifty or sixty, and that there are many young girls who are capable of making splendid teachers of younger children at sixteen or eighteen. They maintain that, if a teacher is genuinely 'good,' she will retain her positive qualities into old age and advocate that a health-limit, instead of an age-limit, be established. Some are of the opinion that, unless they could enter the profession at an early age, many who would prove good teachers would take up some other line of work, such as stenography or bookkeeping, as a means of earning a livelihood. Others advocate a raising of the requirements for admission to teachership, arguing that, if this is done, only the fittest will get in, and they will tend to be those who will keep their good teaching qualities to the end."

The matter of sex differences in the profession, which is touched upon lightly in the answers to question II, is grasped by the roots in question III, "What are the effects of continuous teaching on the different sexes in (A) health, (B) temper, (C) devotion to methods, (D) open-mindedness and readiness to accept and adopt new ideas?"

Total number of answers........................ 137

Returns to Question III

F. 25. I think men have a tendency to reduce everything to a method so they would become more devoted to method than would women. Women have a greater desire to awaken interest and so would use any method that would bring about the desired results.

I believe men are more ready to adopt new ideas than women. Man is more naturally an experimenter and so would more readily adopt new ideas.

M. 44. As to health, teachers are accepted by life-insurance companies as good risks, but the tendency is toward ill-temper; a long period of teaching tends to inflexibility of method and unreadiness to accept and adopt new ideas.

Those who believe that changes in these connections depend only on personality	9
Those who believe that changes depend on school surroundings and the personal life of the teacher	1
Those who mention changes, but emphasize the fact that there are exceptions	9

A. Health.

1. Deteriorates for both men and women with continuous teaching	38
2.) Deteriorates for both but more for women	59
3.) Deteriorates for both but more for men	1
4.) Deteriorates for women not for men	27
5.) Deteriorates for men not for women	1
6.) Health of neither men nor women is impaired by continuous teaching	6
7.) Health is often impaired after continuous teaching, but there is no essential reason why it should be	5

One hundred and thirty-one people think that the health both of men and of women suffers as a result of continuous teaching and only six feel that it does not. In the matter of which is harmed more in this respect, a comparison of figures for each sex indicates that women are far more liable to experience the ill-effects than are men—a point which is further strengthened if we enumerate the frequency of mention of impairment of women's health as compared with that of men, including for both the first item under (A), the resulting proportion being one hundred and twenty-four to forty.

Terman[1] says, "As will be shown later in detail, investigations indicate that the teacher becomes superannuated at a decidedly earlier age than the lawyer, physician, state official, or man of business. . . .

"The teacher may hold a position for several years after forty-five, but if, at this time of life, the old position is lost, a new one is not easily obtained; she is looked upon as passée, and is always at a disadvantage in competition with the hopeful and enthusiastic girl of twenty or twenty-two years, newly graduated from the Normal School. . . .

"It is not uncommon for city school departments to refuse by rule even to consider the application of a candidate above the age of forty-five years, however successfully the applicant may have served in other positions. Unless such rules can be shown to rest purely upon prejudice or ignorance, they must be accepted as proof that the work of the teacher is sadly unhygienic."

Further Terman states that the average age for retirement in England is fifty-three for males, and fifty-one for females; in Saxony the average is forty-nine and one-tenth for men, in Hesse and Bavaria, fifty-one and seven-tenths.

"Only one and eight-tenths per cent of German secondary teachers in active service are above sixty-five years of age, while the proportion of judges is about six per cent. University professors reach superannuation later than any other class of teachers, but even these are usually retired, under the Carnegie Foundation, at the age of sixty-five years, the age when lawyers are commanding their highest fees and statesmen are making world-history."

Terman also gives statistics which show a higher tuberculosis mortality for the profession than for the notoriously unhealthful occupations of stone cutter or saloon-keeper. His conclusions are as follows:

"There is higher mortality from tuberculosis for teachers, both male and female, than for persons of the corresponding sex in other occupations (excess being never less than nineteen per cent and as high as twenty-six per cent).

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[1] Terman, Lewis, The Teacher's Health. Houghton, Mifflin Co.

"There is higher mortality from tuberculosis for female than for male teachers, the difference being forty-three per cent for white teachers, and thirty-nine per cent for all races."

The investigations of Wichmann[2] prove that it is the beginning teacher who runs the greatest risk of pathological nervous exhaustion. With forty-seven per cent of Wichmann's neurasthenics the nervous troubles appeared in less than five years, and within fifteen years for eighty-seven per cent.

The above seem to justify, in two respects at least, the deductions from the replies to the questionnaire that both health and temper, in so far as that connotes nervousness, suffer with continuous teaching, and that women are at the greater disadvantage in regard to health.

B. Temper.

1.) Temper of both men and women deteriorates with continued teaching	49
2.) Temper of both deteriorates, but that of women more	22
3.) Temper of both deteriorates, but that of men more	7
4.) Temper of women deteriorates, but not of men	18
5.) Temper of men deteriorates, but not of women	2
6.) Temper of neither deteriorates	6
7.) Temper of teachers of very small children and of kindergarten improves while that of teachers of older children deteriorates	2

Here again woman is the greater loser, to judge from the comparative preponderance of opinion in these replies, though a substantial number make no distinction as regards the sexes in this respect.

C. Devotion to methods.

1.) Inelasticity of both men and women increases with continued teaching	65
2.) Inelasticity of both men and women increases but that of women more	15
3.) Inelasticity of both men and women increases but that of men more	10
4.) Inelasticity of women not of men increases	14
5.) Inelasticity of men not of women increases	10
6.) Inelasticity of neither increases	5
7.) Inelasticity varies with individuals not with sex	2

Some few more of the writers of these returns accuse women of being more devoted to method than are men, but the great majority of them make no distinction between men and women in the development of this trait, although they believe that it is augmented by continuous service in the profession.

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[2] Weichmann, Dr. R. Zur Statistik der Nervosität bei Lehrern. Zt. f, Scheges. 1903.

D. Open-mindedness

1.) Diminishes with both men and women as a result of continuous service	50
2.) Diminishes with both men and women but more in the case of women	11
3.) Diminishes with both men and women but more in the case of men	6
4.) Diminishes in women not in men	19
5.) Diminishes in men not in women	10
6.) Open-mindedness remains in both men and women	8

In this respect also where any distinction is made between the sexes, women are more afflicted than men, but the great body of these answers made no line of division between the tendency to diminishing open-mindedness in men and in women.

The weight of opinion in regard to question III, then, seems to be that continuous teaching has ill-effects on health, and temper, and tends to develop inelasticity and to diminish open-mindedness. That there is any more effect on one sex than on the other in these respects is not suggested by most of these papers, except in the matter of health and of temper, which are thought by more people to deteriorate to a greater degree for women than for men. In every case where there was a differentiation expressed between the sexes, however, women showed to greater disadvantage than men. The deduction possible from these returns is, then, that loss in elasticity, and open-mindedness result for both men and women from continuous teaching, but are not distinguishing marks of either sex on this point, though physical deterioration and loss of temper are more frequently noted and greater in women than in men after continuous service.

If the above are traits of teachers as they advance in years, we may well inquire whether they are like or unlike the characteristics generally ascribed to advancing years, and question IV. which asked, "What physical, mental and moral idiosyncrasies tend to increase with age?" furnishes some light on this subject, although many of those who replied wrongly understood it to apply to the age of teachers only.

Of those who understood the question correctly, the following answers are samples:

F. 20. Apt to become single-minded; see only one side of a question and perfectly incapable of ever becoming convinced that anything different from their ideas is right.

The whole physical make-up has a tendency to take on a drooping appearance. The mouth and facial features droop. Shoulders come forward, chest goes down, knees bend when walking, heels apt to slide on the sidewalk.

They are apt to become very strict and eccentric in their moral ideas.

F. 30. Loss of strength and of will-power is a result of old age.

Old people are apt to develop patience and loveliness of character with increasing years, which is finally surmounted by second childhood.

F. 26. There is apt to come a carelessness in dress, a dislike for new ideas and new study, and a feeling that their own ideas of morals are a little the best. The person, as he grows quite old, is very sure that he knows.

F. 23. The physical organism tends to be broken down and diminishes; not that rugged independence that they had in youth. As physical power diminishes, mental power cannot exert itself undiminished, for a strong mind must have a strong body. With weakened mental, and physical ability we could not expect one to be so strong morally.

The different idiosyncrasies of age were mentioned as follows:

†Physical weakening	15
†Greater accentuation of physical idiosyncrasies	10
Greater accentuation of moral idiosyncrasies	10
**Setness in mental habits*	10
†Setness in physical habits	8
**Accentuation of mental habits*	8
†Diminished physical activity	8
*Nervousness	7
**Poor memory*	6
**Less open-minded*	6
Fixed moral habits	6
**Narrow*	5
†Stooped shoulders	6
*Impatient	4
Stricter	7
†Careless in appearance	3
**Mentally* slower	3
*Irritable	3
*Over-ride hobbies	3
*Better judgment	3
†Poor sight	3
†Poor hearing	3
†Hollow chest	3
†Lack of physical development	2
†More dignified bearing	2
*Selfish	2
*Serious	2
†More physical care	2
*Exacting	2
*More dogmatic	2
Stronger morally	2
†Peculiar bearing	2
**Duller mentality*	2
*Cranky	2
*Out of sympathy with young	2
**Dwell on past*	2
More moral depth	2
*Dictatorial	1
†Colds	1
**Less mental vigor*	1
*Arbitrary	1
*Settled character	1
*Scolding	1
*Not independent	1
Weaker morally	1
*Lovely character	1
*Self-important	1
*Easily biased	1
**Mental growth*	1
**Less progressive*	1
Morally tend to ideal	1

*_Mentally stronger_	1
†Old fashioned	1
†Clearer voice	1
†Distinct enunciation	1
*Stern	1
†Sterner expression	1
*_Habit of going into details_	1
†More acute hearing	1
†More acute sight	1
*Weaker will	2
Higher moral ideals	1
Moral extremist	1
Tendency to deceit	1
*_Decreased perceptive power_	1
*Kindness	1
*Honesty	1
*Religious	1
†Care in appearance	1
More definite moral code	1
*Less cheerful	1
*_Lack of application_	1
*Less sympathetic	1
*Less social	1
*Disgusted	1
†Tired	1
†Worn-out	1
*Spying	1
*Headache	1
*Sarcastic	1
*_Mentally deeper_	1
*Uncharitable	1
*Cross	1
*Stable	1
*_Weaker mentally_	1
*Patient	1
*Sensitive	1
*Self-satisfied	1

The above constitute the results from only those papers which referred the question to old age in general. There are two hundred and twenty items listed and of these one hundred and eleven mentioned psychic idiocyncrasies, (*) seventy-six physical, (†) and thirty-three moral (_italics_). Only twenty-seven positive qualities were given, establishing a far more striking contrast between negative and positive qualities of old age in general than was apparent in the figures for question I where the replies had to do with very old _teachers_ only in contrast to very young teachers. In that case one hundred and ninety-six voices testified to the positive qualities of very old teachers and two hundred and twenty-eight to their negative traits. So far as these figures are concerned the very old members of the teaching profession appear in a most favorable light by comparison with very old people in general. Under question I the matter of physical condition or externals was practically neglected; here, however, they represent more than twenty-five per cent of the points listed. The moral side of the question, which is the least noted of any for question IV, is not touched upon in replies to question I, but under the group of psychic idiosyncrasies for the former, a division is possible into what may be termed purely mental qualities and traits of disposition; (of these two the former are italicized). Of the total one hundred and eleven, fifty-one are purely mental and sixty dispositional, indicating that mental traits of old age, in general, are nearly as notable as are dispositional traits, in contrast to the tremendous emphasis upon disposition, in reference to teachers, that was brought out in the returns to the first question. In so far as these replies are significant, then, physical idiosyncrasies of very old teachers are proportionally fewer than those of old age, in general, or are, at least, not so marked. Dispositional idiosyncrasies, in contrast to mental attributes, are much more notable in very old teachers than they are in people of advanced years, in general, but the latter's negative qualities are far more overwhelming than are those of pedagogues.

Question V, " Do older teachers tend to lose sympathy and contact with children or young people? " evoked reiteration of the accusations implied in the returns for the previous topics.

M. 22. It is my opinion that as teachers grow older they lose sympathy with children and young people. This may not be true, but the child feels that it *is* true.

F. 23. Old teachers, especially those who never have had children of their own, tend to lose contact and sympathy with young people. This is, however, more pronounced in men than women.

M. 27. It is particularly true of women who stay long in the profession that they become tender-hearted to those under their charge, though not necessarily less strict in discipline.

F. 23. I think that older teachers do tend to lose sympathy and contact with children unless it be in the case of primary or kindergarten teachers, who are continually with young children.

F. 30. Unless one makes a strong effort to retain a young heart, I believe older teachers tend to lose contact and sympathy with children or young people.

Total number of replies	141
Affirmative, (including 30 which called attention to many individual exceptions, and three which made exceptions of kindergarten and primary teachers)	101
"Some do, some don't"	13
"Some do, most don't"	13
Unreservedly negative	14

Thus the unreservedly affirmative number slightly more than fifty per cent of all the answers, while only fourteen replies testified unreservedly to the contrary.

Question VI seeks opinion on as to just what a teacher of advanced years is adapted for in the profession. " Nature provides that parents of from twenty-five to thirty-five more easily adjust to younger children than those of forty to fifty. Can older teachers fit more readily the nature and needs of older children, and vice versa, irrespective of increased mental attainment?"

Total number of replies	123

Affirmative (including 15 who said that there are exceptions)	78
Negative	45

The balance for those who absolutely affirmed either here is slightly in favor of the special aptitude of older teachers for teaching older children.

Miss Gulick writes, "Although the question specified 'irrespective of mental attainment,' those who commented upon this question inclined to deal with the intellectual side instead of with the human. They mention the desirability of having older teachers for the kindergarten because their longer experience in teaching would enable them to guide, direct and control their pupils better, say that young teachers are inclined to be too garrulous and absorbed in their special enthusiasm to really appreciate the needs of their students, and remark on the over-self confidence of older teachers due to their accumulation of knowledge."

The seventh topic was, " Mere age and years bring an unique psychic development apart from increase in learning. Does this tend to qualify or disqualify school work with any age or grade of childhood or is there a "teaching age"?

Total number of answers	99
Affirmative (There is a "teaching age.")	66
Negatives (There is no "teaching age.")	26
Do not know	7

Of these replies Miss Gulick writes, " The results of this question as listed do not have much significance on account of the great variety of ways in which the question was understood.

"Answers varied as follows:

" 1a.) No, there is no 'teaching age' for the age at which persons can do their best teaching is different with different individuals.

" 1b.) Yes, there is a 'teaching age,' but the years that it covers differ with individuals.

" 2a.) The changes that come with age do not disqualify a person for teaching. They increase his qualification. There is no 'teaching age.'

" 2b.) The changes that come with age do not disqualify a person; they make him more qualified. Yes, there is a 'teaching age' below which a person is not a good teacher.

" 3a.) The changes that come with age disqualify a person for teaching, therefore there is a 'teaching age.'

" 3b.) No, there is no 'teaching age,' though the changes that come late in life may disqualify a person for teaching.

" In the case of many of the answers it was impossible to determine to which group they belonged even though they may have contained a negative or affirmative answer."

The steady growth and gain in knowledge and power is ascribed about equally to men and to women teachers by the returns to question VIII.

Total number of answers	192

Among these replies one hundred and twenty-two described teachers known to themselves, and of these sixty-three were male and fifty-nine were female. Five said that they did not know any such teacher.

The papers containing responses to question IX list more men than women as having "long since ceased to grow, become stereotyped in opinion and method, prejudiced, and neophobiac."

Of the one hundred and sixty-three replies ninety-eight were descriptions of teachers actually known to the writers, and of these fifty-five were men and forty-three women. Thus any deduction on the basis of sex in connection with this or the previous question is of very slight value as the two sets of answers counteract each other in this respect.

A few examples of the returns will show that it is possible to get a fair idea of the concomitants of steady growth and gain in knowledge and power.

Replies to Question VIII

F. 27. I know a lady teacher who must now be nearing sixty years. She is careful of her health, keeps in close touch with her pupils, taking a friendly interest in them even after they have left her, but, as their teacher, their pleasures are hers, and their sorrows are shared with her. She comes with a fresh message, apparently, to every lesson, though she has taught the subject for years, but she reads of the things going on about her now, and. makes them freshen the old. She is always young.

F. 40. Teacher of forty years of age, medium height and weight, dark hair and eyes, pleasing features and happy facial expression. Health excellent. Habits regular. Inclined to be sociable. An active church member. Has taught primary grades continuously for over twenty years. Keeps her health good by proper attention to hygiene, relaxation after school hours and during vacation. Keeps her mind active by good reading and by interest in people and things. Keeps up with times and with her work by reading, attending lectures and by taking an occasional university course bearing on her subject, and by constant attention to details in her own speech (both in pronunciation and correctness in use of words) and in instruction of children by weighing carefully each new method before taking or leaving, in short by *keeping* alive in every sense of the word.

M. 45. Always full of new devices. Neophilic. U. S. map on the floor and constellations on the roof.

One hundred and twenty-one points were given in the twenty available papers in answers to question VIII. Those mentioned most frequently were attractiveness of appearance, personal interest in the pupils and in their lives, and freshness or originality in presentation of subject-matter.

Aside from professional abilities in connection with the class-room work, methods, and treatment of the subject, there are certain general characteristics of the teacher which are very often mentioned in these answers. These may be classified as traits that have to do with the teacher as a social entity and those that deal with purely subjective development. These general or dispositional qualities were given ninety-two times, the social traits noted sixty-eight times as against twenty-four for the subjective traits. Skill in handling the content of instruction is listed nineteen times, outside professional and intellectual interests, twelve, and physical points, thirteen times.

This, then, suggests that the teacher with human interests has a considerably greater likelihood of gaining in knowledge and power than has the one who develops admirable traits which flourish independently of his relations to others. The presence of positive qualities, even of the latter sort, establish, however, a greater probability of good results of continuous teaching than do skill in handling educational material, intellectual or professional interests outside of school, or physical advantages. A noteworthy indication of the returns is that dispositional qualities are far more often mentioned than is efficiency with the work, hinting at a possibility that the subject-matter of the class-room is a far less impressive constituent factor than positive dispositional qualities in yielding a bountiful harvest for the teacher.

Under question IX the reverse side of results of continuous teaching is considered. Only thirty-one papers of the above number on this topic were available, but they furnished one hundred and one items.

The traits that accompany cessation of growth, etc., which are noted most frequently are dependence on text-book, laxity in discipline, unsociability, and tendency to fall into ruts, to be easily imposed upon, to be mechanical, and failure to keep up with the times.

Grouping the answers on the basis used for the previous question, we find that dispositional qualities are mentioned sixty-three times, lack of efficiency in method, and in handling the subject-matter of the class-room, twelve times, lack of outside professional and intellectual interest, nine times, deficiencies in personal appearance and physical condition, fifteen times, good physical qualities, twice.

Of the sixty-two negative dispositional qualities fifty-one might be termed anti-social traits and the remaining eleven, negative individual characteristics.

Here again the emphasis rests on dispositional qualities—though they are undesirable ones—rather than the relations of the teacher to the subject-matter of the class-room; and of the dispositional qualities, those dealing with the social reactions to and on other human beings seemed more striking than the purely subjective traits. These answers tally with similar findings in the replies to question VIII.

In general, then, these papers imply the co-existence of positive dispositional qualities and growth in knowledge and power, and that the cessation of growth, tendency to become stereotyped, in opinion and method, prejudiced, and neophobiac, is accompanied by a variety of negative dispositional traits. "To him that hath shall be given, and from him that hath not shall be taken away even that which he hath." Dispositional qualities of either sort make a much more frequently mentioned impression than does scholarship—whether it be present or lacking. This bears out the deductions based on the returns to question I, which mentioned dispositional traits six hundred and fifty-five times in contrast to two hundred and sixty-four for mental qualties.

The request for suggestions to aid teachers to conserve the period of most rapid growth, and to avoid the evil of monotony, repetition, stagnation, and mechanism met with responses from one hundred and seven people.

The advice most often given was "read educational periodicals, know what goes on in the world, study the children individually, and collectively, attend lectures, suppers, dances, church, keep methods flexible and adaptable, attend teachers' meetings, keep awake and plan so as to make the work interesting, take courses in university or normal school from time to time, visit schools and compare methods, keep yourself open to new ideas, associate with the children and know them in their homes, be out of doors, walk, row, exercise.

There were four hundred and thirty-four items which may be classified as dispositional qualities, which were mentioned one hundred and seventy-three times, outside professional interests, one hundred and forty-one times, suggestions for the class-room, sixty-one, and advice on physical condition and personal appearance, fifty-nine times.

If figures are significant, dispositional traits again take the lead as the most important factor in teaching. Of the one hundred and seventy-three mentioned, one hundred and twenty-five are in the category of what have previously in this paper been termed social traits, and forty-eight are the so-called individual or subjective characteristics. Under this topic for the first time there appears a recognition of the requirement of scholarship as practically on a par with positive dispositional qualities as an element in the conservation of the period of most rapid growth.

In spite of the admittedly incomplete data in connection with some of the questions, the opinions of the people who replied to the questionnaire have certain rather significant trends which can be summarized thus:

I. The most striking differences between very young and very old teachers are seen in the predominance of setness of method, fixedness of opinion, and resentment of suggestions for improvement on the part of very old teachers. The characteristic strength of the very young teachers lies in dispositional qualities, and the weakness in mental traits, while the very old teachers' positive qualities are mental, and the negative ones are dispositional.

II. There should be age-limits for teachers. Eighteen or twenty years is the lower limit, and sixty years the favorite upper limit, if any.

III. The health and the temper suffer more from continuous teaching in the case of women than of men, but both are about equally liable to lose elasticity and open-mindedness.

IV. Negative psychic idiosyncrasies, especially, tend to a decided increase with age, mental and dispositional traits being about on a par; there is also a marked increase of negative physical qualities. Old teachers are not invested with so preponderantly many negative qualities as are old people in general.

V. Older teachers tend to lose contact and sympathy with children and young people, but fit more readily the nature and needs of older children.

VI. Teachers who grow in power and knowledge with continuous service are endowed with or acquire positive dispositional qualities, while those who cease to grow possess a superabundance of negative dispositional qualities.

VII. Positive dispositional traits—especially of a social kind—are an even greater factor in the conservation of the period of most rapid growth of the teacher than are professional interests and activities outside of the class-room, which are rated, however, as very important.

VIII. In general, dispositional qualities—both good and bad—are much more impressive than any other traits in a teacher.

The emphasis on dispositional qualities in the foregoing data would seem to imply that by virtue of his overwhelmingly negative dispositional qualities the very old teacher should be dispensed with; but Book[3] made a finding which is pertinent here. He writes:

"Again the favorite teacher was described as enthusiastic, energetic, young. . . . In fact most pupils think that only young teachers are capable of understanding them. . . . Old teachers are, as a rule, disliked.

"This qualification was emphasized in still another way. Many pupils suggesting improvements for the High School strongly urged the getting rid of all old teachers and replacing them by young teachers who were strictly up-to-date, interested in their work, and thoroughly in sympathy with their pupils.

"It should be stated, however, that the pupils did not mean by old and young a mere age distinction in the ordinary sense. According to them some teachers have never been young, others never get old. Being young, in the students' own words, means to be enthusiastic, full of life, up-to-date, thoroughly in sympathy with young people and their ways. . . . To be old is to be cranky, pedantic, old-maidish, behind the times, out of touch with the young, impatient, cross, to become indifferent, suspicious, didactic, set in one's ways, more and more the creature of habit, and the slave to one's yesterdays, to lose interest in one's work, and finally to reach a sort of static condition where one ceases to grow, and gets fat. The teacher who was described as quite an old lady, but at heart as young as any girl in her class, who was up-to-date in her teaching and knew just how a girl studied her lessons, her ideas about clothes and all her likes and dislikes, was young in the sense the pupils used the word, although she had taught in that school for over thirty years."

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[3] Book, William F. The High School Teacher from the Pupil's Point of View. *Ped. Sem.* Vol. XII.

Thus the very old teacher who has the positive qualities mentioned would never be accused of being old. The spirit, not the years seems to be the measure of age.

The fundamental point for pedagogy, then, is that age in disposition is what counts for the teacher. Just so long as he retains certain dispositional qualities, the older teacher is the superior of the young teacher, by virtue of his wider experience and greater knowledge, which latter, however, become as sounding brass if he have not the former.

AMBIDEXTERITY AND DELAYED SPEECH DEVELOPMENT

By MARGARET MORSE NICE, Norman, Oklahoma.

The present paper is a study of a number of cases of delayed speech with special reference to the "handedness" of the children. It has often been observed that interference with congenital left-handedness has caused disturbances in speech, although this does not always happen; the literature on this subject will be reviewed briefly.

Whipple ('11) reports three such cases and in a personal letter speaks of "ten or twelve more." Jones ('15) says, "The fact that I have found a larger number of feeble-minded individuals and stutterers among the 419 transfers of my study easily causes me to fear any transfer from one arm to the other." Smith ('17) found a high percentage of left-handedness in a school for stammerers. Scripture ('17) and her co-workers in the treatment of speech defects report: "Among the left-handed patients who had come to us for training we found a number whose speech defect appeared at about the same time that they were forced to change to the dextral hand. We were able to find some twenty cases which seem to us clearly indicative of the interaction of these two motor coördinations." Bolk and Lueddekins ('00) as reviewed by Scripture, "found an anomaly of speech in 24 per cent of the left-handed children of normal mental qualities, in those of mediocre, 35 per cent and in those of lower mental qualities, 44 per cent." Ballard ('12) examined 431 left-handed school children and gives convincing figures. He found that: "The proportion of stammerers among normal children is probably not higher than 2 per cent; but among dextro-sinistral (left-handed yet forced to write with the right hand) children of school age the percentage is 17. One in every six stammers, and, if the past school career is taken into account, one in every four." "It is highly significant that among those cases where no serious attempts had been made to change the skillful hand, not a single instance of stammering appeared." Stier ('11) found the percentage of stutterers among the German soldiers in general is at the highest 0.5 per cent, but among the left-handed soldiers from

6.6 to 8.5 per cent, ten times as much. Of 33 left-handed children, 17 stuttered, stammered or lisped.

Prof. C. W. Shannon of Norman, Okla., tells of a very left-handed boy, 12 or 14 years old, whose family and teachers had tried to make him use his right hand. He talked very fast and stammered to some extent when excited.

The following analysis of a case of speech difficulties in connection with left-handedness has been given me by Mrs. Miriam Oatman-Blachly of Norman, Okla. F. comes from a long line of physicians, ministers, missionaries, lawyers and college professors, his father and mother having been first cousins. He is the second of eight brothers. He was brought up in Colorado where school facilities were poor and many of his associates were illiterate, yet those who formed his home circle were all persons of culture. His grandmother and father possessed a considerable talent for making rhymes and jingles, a gift shared by F. The grandmother instructed the children in mathematics and theology, their uncle spent hours in reciting to his nephews the great events in English history, clothed in the most impressive language, while their mother read aloud to the boys a great deal, reading Shakespeare's plays to them before they were of school age. "This family circle must have counteracted to a large extent the tendency to uncouth methods of speech which the rural schools would give. Probably the *opposition* between two speech standards, that of the home and that of the community, ought to be considered in the case under discussion."

F's schooling came to a sudden end when he was 14 years old; for ten years he farmed and raised cattle, yet during this time he read many standard works of English literature and memorized a considerable amount of poetry while riding after cattle. He was finally able to continue his education, completing his preparatory and college work in six years; he received his Ph.D. degree, spent two years in research and since then has been professor of government in a university. "It is evidently not lack of educational facilities that can wholly account for his speech difficulties, though the hiatus during adolescence may have had some effect. However, are not speech habits formed principally in early childhood?"

His father was naturally left-handed, but had learned the use of his right hand. F's fifth brother, now dead, was also left-handed, but was made to use the right hand. He was the slowest of all eight boys in learning to speak, not talking much till he was three or four. He also had great difficulty in writing and spelling.

F. was left-handed, but prevented from using it at a very early age by his father, and also at school was made to use his right hand for writing. He, his father and brother were almost ambidextrous in many kinds of manual work. He began to talk at 14 months, which was later than his brothers except the other left-handed one; the oldest beginning at 9 months. His mother reports that "he was always a very silent child."

F's difficulties in regard to speech are as follows:

"1. F. finds it almost impossible to remember the pronunciation of words, even though he may have been told repeatedly how to pronounce them, or may have looked them up in the dictionary several times. He explains this by saying that his sight is defective, and also that he reads by noticing ideas, not word forms. This is true, but why can he not fix the word form in memory when he *does* notice it, as in using the dictionary?

2. Of a piece with this difficulty is his trouble in acquiring a foreign language. He can read German fairly well, but his pronunciation is hopeless; and however many times he may have been told the pronunciation of a French phrase, he seems absolutely unable to remember it.

3. In memorizing the vocabulary of a foreign language he has great difficulty. Of course he learned them late—after he was 24.

4. Spelling in any language is his *bête noir*. It ought to be remarked that large and technical words which he has acquired late in life are easier for him to spell than those words acquired in childhood.

5. His writing is almost illegible. Examination of the writing of several members of his family shows that they all write legible hands. He prefers to use the typewriter whenever possible, partly because writing with the pen bores him, partly because he says that typing forms an excuse for misspelled words. His writing varies a great deal and is not reduced to standard forms, but he makes the same letter in several different ways.

6. In reading aloud he often stumbles over very familiar words.

7. In lecturing or talking he often has the greatest difficulty in finding the words that he wishes to use, and hesitates noticeably until he recalls them.

8. His memory for ideas, and for details of many kinds, is remarkably good, while his memory for words is very poor. He knows a great deal of poetry and a quantity of scripture, but he seldom quotes anything with precision."

Delay of Speech in Connection with Handedness

Before we can discuss the subject of delayed speech development we should establish, if possible, some standard of normal speech development.

Normal Speech Development

The First Word

Bateman ('17) has reviewed the literature on this subject and gives us exactly the data we need. Of eighteen English speaking children, one began to talk at 8 months, two at 9, five at 10, one at 10½, three at 11, three at 12, one at 13 and two at 14. " Of the 35 children, 15 or 42.85 per cent are in the 10-11 group, while 26 or 74.28 per cent have begun articulate speech by the end of the first year." " From the above it would appear that a child of good heredity and environment who has not begun talking at 15 months of age is more or less retarded in this respect, and a like failure at 18 months should instigate an examination for probable cause."

Normal Speech Development at Two Years

Twenty-five vocabularies of two-year-old English speaking children appear to have been published, 18 of girls and 7 of boys. The girls, except for a single example of one very small vocabulary of 36 words (Tracy, '95), range from 263 to 1,227 words, their average being 556. The boys range from 115 to 771 words, their average being 384. The average of all 25 is 508. Since many of these vocabularies are probably unusually large, a safe estimate would seem to be that the normal child of two years has a vocabulary of 200 words or more.

Moreover, the average child of this age is putting words together in sentences. In studies of children's vocabularies the date of the first sentence is given at 14, 15, 16, 17, 17, 19 and 19 months. The only one who is reported as beginning later than two years is Mateer's brother ('08), who was undeniably retarded in talking: " he was three years old before he began to make any connected sentences in speaking." Holt ('10) voices the consensus of experience when he says, "At the end of the second year the average child is able to put words together in short sentences."

Normal Speech Development at Three Years

The 11 published vocabularies of three-year-old children range from 681 to 1,807 words, their average being 1,338. Six hundred words for the vocabulary of the normal three-year-old would seem a conservative estimate. The speech of the ordinary three-year-old child approximates that of the adult, i. e., verbs are inflected, conjunctions, articles, pronouns and the verb "to be" are all used.

To sum up then, our standard for normal speech development is: the first word by 15 months; at two years, a vocabulary of at least 200 words, and sentences used; at three years, a vocabulary of at least 600 words, and the parts of speech all represented.

Delayed Speech of Left-Handed Children in Connection with Compulsory Right-Handedness

Stier ('11) found that 6 of the 33 left-handed children already mentioned—18 per cent—learned to talk late. In 1915 I published some observations on a little girl who had been prevented from using her left hand till she was two, but left free after that; she is still decidedly left-handed. She did not talk at all by the time she was two and at the age of three and a half her language was almost unintelligible. She improved rapidly in speech after this until at four and a half she talked nearly as well as other children of her age. Now, at the age of seven in the third grade she has a good deal of difficulty with spelling, though doing well in her other subjects.

L., a boy fourth in a family of six children, was naturally left-handed, but prevented from using it by his father at an early age. The other five children learned to talk at the conventional age, the oldest beginning at eight months. I spent a day with his mother when he was 28 months old; the only words I heard him say were "Mamma" and "Moo," but probably there were some others he could use. In answer to my questions, his mother wrote me when he was four years old: "L. was very backward about talking but began to talk all at once. He must have been nearly three years old." I saw him at four years and again at five years and four months. At both periods he stuttered when excited, and at the latter age he could not pronounce "r" nor "dh," saying "Mawy" and "dat."

Another case of delay in speech following interference with left-handedness would appear to be furnished by Major's ('06) boy. At one year old the child was clearly left-handed so the parents started in systematically to break up this preference. By the 16th month the right hand began gradually to have the place of ascendancy and by the end of the second year the child was "decidedly right-handed and has been ever since." p. 45.

His speech was markedly imperfect by the time he was three, as the following quotations will show. "The only forms of the personal pronoun which I am sure he used prior to the fourth year were 'I, itself, himself and it,'" p. 308,—a very small list. "He used 'I' a dozen times during the latter part of his third year. The 'I' seemed to take the place of 'Wa' or 'Wadu'—his name for himself—for the moment." He used no conjunctions at three. His father, evidently generalizing from the state of his son, says, "The relative pronouns are not used until long after the close of the period now under review" (the first three years), p. 308. However, of nine published vocabularies of three-year-olds, every child, except possibly one, used relative pronouns. The sample sentences given for the 35th and 36th months show clearly his retardation in speech.

"Was Wa han uh suf." (Wants to wash his hands himself.)

"Tull Wa uh sins." (Tell R. what these things are.)

"Baby tine uh git uh soap." (Baby is trying to get the soap.)

"Iss like uh tsame." (This card is like that one.)

A fourth example is furnished by N., a boy, only child of a University professor of sociology; the information was given me by his mother, a psychologist, Mrs. Anna Kranz Odum of Athens, Ga. N. has always been well and robust; he did not walk with assurance until past 18 months. He has always used his hands well.

Before he was one year old "he had seemed to use the left hand in preference to the right although the right hand was used sometimes for throwing his toys or in fitting things together." At about one year he started to suck the index finger of his left hand and in consequence had to wear a little mit. "Therefore he was forced to use the right hand from then on for exact manipulations. The mits were of thin cloth and loose enough for fine movements of the fingers." Now, at the age of four, "the finger sucking habit persists momentarily when fatigued or hungry. He is ambidextrous and uses his fork with either hand or his pencils, and throws balls with either hand."

He began to talk at eight months, using "the word 'pretty' often and with various applications—to express satisfaction—something desired and as a name for his toys." He had about six words at one year. Simultaneously with the interference with his left-handedness there appeared an arrest in his speech for the next six months; at eighteen months he had less than a dozen words in his vocabulary. His attempts at learning to walk at the end of this period might possibly have had something to do with this "plateau," but it hardly seems possible that the influence could have lasted so long. "From 19 months on he added new words to his vocabulary rapidly. From two years on he talked much and used a variety of words and short sentences, making sentences of five and six words at two and a half years." Recently from three months before his fourth birthday to two months after, "he has shown more or less marked spells of stuttering, on occasions when he seems excited or intense over something he is trying to relate."

N's left-handedness was interfered with, but instead of his being forced into right-handedness as the two other boys mentioned, or remaining left-handed as the girl did, he is still ambidextrous at the age of four, even to the extent of drawing with both hands which seems most unusual. He began to talk early before the interference began; the six months arrest in speech occurred at the same time as the interference. His stuttering at four years may have some relation to the earlier interference with his left-handedness, or to his present ambidexterity.

AMBIDEXTERITY AND DELAY IN LEARNING TO TALK

Seven children whom I have observed in the last three years have shown retardation in their speech development and at the same time more or less marked ambidexterity.

As we have established a standard for normal speech development, let us see whether we can do this for "handedness," that is, when is right-handedness definitely established in the average child?

NORMAL "HANDEDNESS"

There do not seem to be many observations on the normal development of right-handedness in the baby. Meyer ('13) "states the fact of general left-handedness in infancy," by which term he means the first six or twelve months, but he gives no observations on which he bases his belief. Mrs. Wooley's ('10) baby was left-handed at 7 months and right-handed after 9 months. Baldwin ('95) as a result of very elaborate experiments found that his daughter was ambidextrous when 5, 6 and 7 months old, right-handed at 8 months and left-handed at 9 for a neutral stimulus within easy reaching distance; but when a colored object was substituted, or the neutral stimulus placed farther away, she was decidedly right-handed at this latter age. Dearborn's ('10) daughter was left-handed at five months, right-handed at 10 months, ambidextrous at 12 months, and right-handed at 19 months. Major's ('06) boy was ambidextrous at 3 months, right-handed at 4 and 5 months, ambidextrous from 6 to 11, and left-handed from 12 to 15 months. His left-handedness was discouraged as before mentioned so that by 16 months he was right-handed.

Dearborn's child is the only one observed after a year old, except Major's boy, who, of course, had not a natural history.

In an attempt to gather more information on this subject, I asked all my acquaintances with babies between one and two and a half years old as to the handedness and speech development of their children. Only four of these parents had had any particular interest in noting the handedness of their children or could give me an idea of when the baby became predominantly right-handed; the others simply gave the present status of the child.

Sex	Handedness	Speech	Present age in months
Boy[1]	Right-handed at 6 months.	Average in talking.	30
Boy	Right-handed, yet uses left somewhat.	Does not yet talk.	13
Boy	Right-handed at 14 months.	Says 3 words.	16
Boy	Right-handed.	About 8 words.	15
Boy[2]	Ambidextrous.	Says 2 words.	16
Boy[3]	Right-handed "early".	Does not use sentences.	22
Boy	Right-handed.	Talks in long sentences.	22
Girl	Right-handed.	Says 3 words.	12
Girl	Right-handed.	About 8 words.	15
Girl	Right-handed.	About 40 words.	19
Girl	Right-handed.	Talks in long sentences.	26
Girl	Right-handed.	Talks in long sentences.	27

[1] Father a physician. Baby had been paralyzed on right side for two weeks after birth on account of pressure of instruments, so parents noted especially when he became right-handed.

[2] Both parents medical students, mother also a biologist.

[3] Grandmother left-handed.

Only one of the twelve children is reported as ambidextrous, a boy of 16 months. Eight of these children were right-handed by the time they were 19 months old and three others may have been. We might say tentatively that if a child is not definitely right-handed by 20 months that the fact is noted by its relatives. But this is a subject on which we need much more data.

The Handedness and Speech Development of the Children Observed

Cases I and II

D. is our second daughter and R. our third. Their father was a precocious talker; according to his mother he "could say everything at a year old, make sentences and tell a story. He talked earlier than any other child I ever heard of; he was a wonder to the neighborhood." Their mother appears to have been an average child in learning to talk, saying her first word, "Addie," at 13 months. All of her brothers and sisters began to speak at about this same age, except the oldest brother who "said very little even after he was two."

Their elder sister, E., exhibited a normal history of speech development, (Nice, '15 and '17) beginning to talk at 14 months, having a vocabulary of 133 words at 18 months and using sentences at 19 months. Her vocabulary at 3 years included 1,139 words; at 4 years, 1,765; at 5 years, 2,502, and at 6 years, 3,075 words. She crept at 8 months and walked at 13. She developed a consistent right-handedness early. She has been less skillful in the use of her hands than her sisters; in cutting, sewing, dressing herself and drawing, D. has done better than E. at the same ages.

Case I

D. has always had a splendid health and a fine physique, all her life being taller and heavier than the measurements of average children in Holt. She crept at 10 months and walked at 15; the reason for her being later than E. was probably because she was heavier.

D. was ambidextrous to some extent till after she was two years of age; at 25 months I noted, "When she draws on the blackboard or on a paper she is as apt to use her left hand as her right." She outgrew this ambidextrous tendency rapidly; in a month or two coming to use her right hand exclusively when using the chalk or crayon.

D. did not begin to talk till she was 20 months old. She learned 3 words that month, added 13 during her 21st month, 16 the next and 13 the next so that she was using 44 words by her 2nd birthday. This is one-thirteenth as large as the average of the published vocabularies for this age. I recorded her all day's conversation when she was 2 years and 2 days old. She said 7 different words and a total of 18. When we compare this with Gale's boy ('00) who used 5,194 words in one day at this age, and his friend's son who used 10,507 words, D. appears considerably retarded!

She learned rapidly after this, adding 24 words the next month. I recorded her all day's conversation again at 25 months and 12 days; at that time she said 28 different words and 152 in all. By 26 months she had attained 145 words and had begun to connect them in sentences. At 30 months she had a vocabulary of 538 words. Five vocabularies of children of this age have been published; two boys had 480 and 1,432 words while three girls had 769, 1,111 and 1,509 words, the average being 1,060, twice as much as D.

At three, D's vocabulary had grown to 856 words. This is larger than two other girls who started to talk at 10 and 10½ months, yet by three years had attained 681 and 736 words respectively. The average of 11 vocabularies (this includes D's) is 1,338. At 35 months we recorded D's whole day conversation; she used 2,018 sentences or 7,600 words, the average number of words in a sentence being 3.77. Her sentences were short; E. and Brandenburg's ('15) daughter at the same age used sentences of 6 and 7 words on an average. When we examine D's sentences we find omissions in many of them. "I write bine (fine) letter. Want to write more letter. No, dit (this) one my cow." Yet, "is," "a," and "I" were not uniformly omitted. From the character of her speech and the shortness of her sentences, I would consider her still somewhat retarded at three, although her vocabulary contained more than 600 words, and she used all the parts of speech.

At four, her vocabulary contained 1,506 words, the average of 7 published vocabularies being 1,843. By this time her speech development was certainly normal.

At five, by the Binet test, she had an understood vocabulary of 3,600 words, the 8 year level.

Case II

R, our youngest daughter.

She has not been so uniformly well as our two older children. From the age of 8 months to 11 she had some digestive troubles, part of the time being under-nourished. But since then she has been perfectly well most of the time. She crept at one year and walked at 16 months.

In giving an account of the use of her hands, I will give only those records that appear to be of most significance. The two main points on which I watched her were her use of her hands in eating and with the pencil.

I will first give an account of her handedness in eating.

At 12 months, I noted: "She seems to be left-handed. She often holds her toast in her left hand and although I change it to the right, she usually changes back to her left."

For the next three months she appeared to be ambidextrous. No effort was made to encourage right-handedness till after she was 16 months old.

At 16 months I tested her three days in succession with cornflakes placed in the middle of her tray. She used her right hand 30 times and her left 22; so that her right was used 57.5 per cent of the time and her left 42.5. After this we took pains to put her cornflakes on the right side of the tray.

At 19 months at one meal when eating cornflakes she used her right hand 7 times and her left 6.

At 21 months when eating cornflakes with her bare hand she used her right hand 18 times and her left 24. She was given a spoon and used it entirely in her right hand. From now on she used her left hand often at her meals, but always changed to her right when it was suggested to her.

At 27 months. I kept track of the use of her hands at meals for the first 12 days after she was 27 months old. During this test period she was never reminded about changing to her right hand but she occasionally did it of her own accord, patting her right hand in approbation.

21 meals were eaten wholly with the right hand.

1 meal was eaten wholly with the left hand.

8 meals were eaten half with the right and half with the left.

4 meals were eaten mostly with the right.

2 meals were eaten mostly with the left.

The proportions may be represented as follows:

Use of Right Hand	Use of Left Hand
21	1
8	8
8	4
2	4
39	17

Therefore she used her right hand 69.6 per cent of the time and her left 30.4 per cent.

I made another series of observations beginning 3 days before she was 28 months old and lasting 7 days. Sixteen days had elapsed between the two series during which time we encouraged the use of her right hand.

18 meals were eaten wholly with the right hand.

3 meals were eaten half with the right and half with the left.

1 meal was eaten mostly with the right.

The proportions are as follows:

Use of Right Hand	Use of Left Hand
18	0
3	3
2	1
23	4

She used her right hand 85 per cent of the time and her left 15.

The use of her hands in these three tests may be summarized as follows:

Age	Use of Right Hand	Use of Left Hand
16 months	57.5 per cent	42.5 per cent
27 months	69.6 per cent	30.4 per cent
28 months	85 per cent	15 per cent

During her 27th month the preponderance of her right hand became so marked that by 28 months her ambidextrous tendency had almost disappeared.

Now as to the use of the pencil.

At 16 months she took a pencil with her right hand, changed to her left and made marks with it.

At 17 months she crayoned on paper and wrote once with her right hand and twice with her left.

At 25 months I gave her chalk in her right hand, she transferred it to her left and marked on the board with the left. The next piece she took in her right hand and marked with the right. With the third piece she began to mark with her left hand but changed to her right. The next was used with the left hand, but the last three were with the right. She marked five times with her right hand and three with her left.

When 26 months and 2 days old, she crayoned a little with her left hand but mostly with her right. Three days later she started to scribble with her left hand but quickly changed to her right.

When 27 months old she used her right hand exclusively for drawing.

In summing up this phase of her development, we find that at 16 and 17 months she used the pencil in either hand indiscriminately; at 24 months she was in the experimental stage but showing a slight preference for the right hand; at 26 months this preference had increased, but she was still experimenting to some extent. By 27 months she had definitely discovered that the right hand was the hand to draw with. In the use of the pencil she was left absolutely free to work out her own experiments and was not helped by direct training as in the use of her spoon and fork.

R's speech development has been unusually slow. She began to talk at 16 months, saying 2 words that month, but these 2 words sufficed her for 5 months. Her vocabularies of total words for each month follow: 16 months, 2 words; 23 months, 4 words; 24 months, 5 words; 25 months, 8 words; 26 months, 12 words; 27 months, 15, and 28 months, 25 words. Her vocabulary of 5 words at 2 years is one-hundredth the size of the average of the published vocabularies. I recorded her whole day's conversation at 2 years and one week; she said 3 different words and 53 in all. Her 25 words at 28 months should be compared with the published vocabularies of this age (Bateman,'16); there are six of these for English speaking children; they range from 308 to 677 words, the average being 469, 19 times as large as R's.

By 27 months R. had become entirely right-handed in her use of the pencil and by 28 months she was almost entirely right-handed in her use of the spoon. During her 27th month she made much more progress in talking than in any of the preceding months, her vocabulary increasing 66 per cent.

Although R. is so loath to speak, she constantly surprises us by the amount she understands. She makes us understand her too, by shouts, grunts, exclamations, squeals, gestures and by taking hold of us and leading us to the desired place. Pretending not to understand her, nor really failing to guess her meaning seem to be no encouragement to her to express herself more fully by the conventional method.

Case III

C. is a cousin of D. and R., her father being brother of their mother. Her father "was very slow in learning to talk, and said very little even even after he was two." She has two older brothers who were perfectly normal in their speech and handedness, the oldest being rather precocious in his use of language. She had a severe illness—pneumonia and ear trouble—from the age of 7 to 9 months, but since then has been exceptionally well and sturdy, a very large child for her age.

At 28 months, at which time I saw much of her, she was markedly ambidextrous; she would eat with her right hand for a while and then with her left. She seemed to use her two hands perfectly interchangeably.

Her vocabularies at 2 years, 28 months and 30 months were collected by her mother, Mrs. Ruth Tucker Morse of Princeton, N. J.

2 years:

Nouns: 8. Baa, ball, brother, bow-wow, Daddie, Mamma, moo, quack.

Adverbs: 3. Downstairs, more, no.

Interjections: 2. By-by, hullo.

Total—13 words. Adding one proper noun makes 14.

28 months: All of 2 year vocabulary repeated except "baa" and "quack."

Nouns: 18, 6 old and 12 new. Animal cracker, auto, baby, bath, bread, brush, butter, choo-choo, girl, milk, potato, water.

Verbs: 2. See, come on.

Pronoun: 1. Me.

Adjectives: 3. Dirty, good, poor.

Adverbs: 8, 3 old and 5 new. All gone, outdoors, please, there, yes.

Interjections: 3, 2 old and 1 new. Oh.

Total—35 words. Adding 4 proper nouns makes 39.

30 months: All of preceding vocabularies repeated.

Nouns: 69, 20 old and 49 new. Apple, bag, beads, bed, bib, bird, block, boat, boy, box, clock, cloth, color-book, cocoa, cup, door, dress, egg, fish, geese, hands, hat, hay, hole, horse, ink, juice, key, man, meat, moon, paper, peach, pear, picture, piece, pin, pudding, rooster, rubber boots, rubbers, sheet, shoe, slippers, spoon, stone, teeth, toast, zwieback.

Verbs: 19, 2 old and 17 new. Beat, broke, cry, don't, dress, excuse, get, go, look, open, undress, pull, shut, tore, walk, want, wash.

Pronouns: 4, 1 old and 3 new. I, mine, my.

Adjectives: 11, 3 old and 8 new. All, back, bad, bare, blue, the, new, two.

Adverbs: 10, 8 old and 2 new. Here, out.

Interjections: 4, 3 old and 1 new. Good-night.

No conjunctions and no preposition.

Total—117 words. Adding 5 proper nouns makes 122.

Her vocabulary of 13 words at 2 years is one thirty-fifth as large as the average of the published vocabularies of that age. Her vocabulary of 35 words at 28 months is one-twelfth as large as the average of the published vocabularies for that age. At this time she began to put words together: "Poor Barbar." "See—there dirty."

Her vocabulary at 30 months—117 words, although it shows rapid improvement over the preceding, is only one-eighth as large as the average of the 5 published vocabularies of this age, 1,060. Sample sentences at this time were: "Cho-choo go over the wawa (water)." "Com'on, Mamma, or (I) want bark (Zwieback)."

When she was 33 months old, her mother wrote: "C. still uses her left hand sometimes, but ordinarily uses her right. Her vocabulary has increased tremendously. She is such a chatterbox now that she has really found a use for her tongue."

I saw the child for a few days when she was 3 years and 4 months old. She was decidedly right-handed and a great talker. She mixed her pronouns, preferring to call her girl cousins "he." She did not seem to have quite recovered lost time, most children of her age talking more distinctly and more correctly than she.

Case IV

G. is also a cousin of D. and R. but on the father's side, her father is brother to their father. She is the first child in the family. Her father stutters to some extent.

I saw her for one day when she was 2 years old. At that time she appeared to use both hands interchangeably. This was confirmed by her aunt, a College student, who took much care of her, and whom I asked to observe her.

Although I listened carefully, I did not hear her say a single word. Her aunt reported her two year vocabulary as consisting of 7 words: Baby, Mamma, Papa, see, here, now, by-by. This is one-seventieth as large as the average of the published vocabularies.

I saw her again for a day when she was three and noticed that she still used her left hand equally with her right. Her father, when asked whether G. was left-handed, said, "She uses one as handily as the other," and then bade her eat with her other hand and she obediently changed from her right to her left. There has been no attempt to encourage right-handedness in her case.

She is a quiet, rather shy child, and talked less than usual with strangers about. All I heard her say were single words: "Eggy," "broke," "bile (auto)," "baby," "don't," "Poppy." Her relatives said she did put some words together, but all they could think of were "Grea' big bile," "Grandpa's baby" and "big blue hen."

G. apparently talks less than an average 2 year old child. She is the oldest child I have personally observed who uses one hand as much as the other.

Her sister, 18 months younger than G. uses her right hand more than her left. She talked nearly as much as G. when I saw the two children. Two months later their aunt wrote that she "talks better than G."

Case V

M. came under my observation when 3 years old as a playmate of my own children. She is the daughter of a physician, having one brother 7 years older. She was delicate as a baby, as was her brother.

Her mother said she had been slow in learning to use her right hand; she would take her spoon in her left hand and her mother would have to change it. Yet if she spoke about it, M. would be apt to persist in her wayward ways.

She talked late; her mother was in despair lest she never would talk. She hardly talked at all at 2, and did not form sentences till she was 2½, whereas the brother talked in sentences at 18 months. At 3 years and 3 months it was impossible for a stranger to understand her when she said more than a few words. She left out " is " and many of her consonants.

Case VI

U. is a girl, only child of a farmer. I became acquainted with her and her mother on the interurban when she was 20 months old. She was a large, healthy looking youngster who had walked " at 14 months all at once." Noticing a scar on her left thumb I asked the cause of it, and how she used her hands. She had fed the cat and been bitten. She used her left hand " right smart," always for throwing, so that her father was bothered. However her mother said she used her right hand more. There was no left-handedness in the family.

She talked very little according to her mother, saying " Daddy," " myow," " ch " for horse, " all right," and " Where is it?" All others of the family connections have been in the habit of talking long sentences by the time they are two years old.

Case VII

W. is a boy, only child of a college professor of biology. I saw him often from the age of 10 months to 18, but practically all the data has been supplied by his mother, a writer, Mrs. Marjorie Hill Allee, of Lake Forest, Ill. W. has always been a sturdy child and large for his age. He walked at 14 months.

He was ambidextrous till he reached the age of two and a half. " He was not any more left-handed than right-handed, my impression is that he always favored the right hand a little," wrote his mother. " I used to take some pains to put his spoon on the right hand side of his tray, but I don't need to do that any more (at 3 years). At 2 he was still uncertain which hand to use. At 3 he much prefers his right to his left, but is not particularly clever with either, though quite strong."

As to his speech history, "at 18 months he had a rather indefinite 'see' and at 20 months he added a very plain 'cow.' He seemed to understand our talk to him well enough for all practical purposes." At 2 he said only a few words.

His mother started to collect his vocabulary at 3, but sent it on still incomplete. She did not include proper nouns, nor animal noises, "nor colors, nor numbers, of which he is still rather uncertain, though in a general way be understands their meaning. Outside of these I should say that there were perhaps 50 more words I have not caught and that the majority of them were nouns." As it stands it contains only 271 words; adding 50 makes it 320. Of course this is approximate, yet it is significant on account of its very small size. The smallest 3 year old vocabulary published contains 681 words, the largest 1,807 and the average of the eleven published is 1,338—four times as large as W's.

His pronunciation was imperfect, final letters often being left off. "His supply of verbs is very short and irregular; of these he can use the third singular present and the 'ing' form in every case. Usually he leaves out the verb if possible." Of personal pronouns he used "me, mine, my, you and thee." "My" was often used as the nominative. He did not use "I, we, him, her" or "they," substituting the name. He used "me" occasionally but confused it with "my" or "mine." He did not use "a" or "the."

"He isn't at all certain about colors and while he knows a few colors he cannot be relied upon to tell even black from white. Red seems to be a pretty certain quantity."

Sample sentences at this time were:

"One time was old man. Climbed up tree."

"Time go bed for mine. Going kiss—you me?"

"My going sit here."

The handedness and speech development of these seven children is summarized in the accompanying table.

TABLE OF SPEECH DEVELOPMENT OF SEVEN CHILDREN

Child	Handedness	Time of first word	Speech development at 2 years	At 30 months	At 3 years
Standard	Right-handed at 20 months	15 months	200 words; sentences used	....	600 words; all parts of speech
D. Girl	Somewhat ambidextrous at 2	20 months	44	538	856
R. Girl	Ambidextrous till 26 months	16 months	5	....	....
C. Girl	Decidedly ambidextrous till 30 months	....	13	117	Nearly normal
G. Girl	Decidedly ambidextrous at 2 and 3	....	7	....	Very few words
M. Girl	Ambidextrous till after 2	....	Very few words	Began sentences	....
U. Girl	Ambidextrous at 20 months	Few words at 20 mos.	....	....	....
W. Boy	Decidedly ambidextrous till 2½	18	Very few words	....	320?

Let us see how the addition of these small vocabularies affects the averages of the vocabularies already published.

The 2-year-old vocabularies of R., G., C., and D. were 5, 7, 13 and 44 words respectively, the average being 17.25. The average of the 18 vocabularies of 2-year-old girls already published is 556—32 times as large; they reduce the average of 2-year-old girls to 458 words. Counting in the boys' vocabularies, the average of all 25 published vocabularies is 508—29 times as large as the average of these four children. The average of all 29 vocabularies is 440 words.

R. with 12 words and D. with 145 at 26 months reduce the average for this age from the 896 words of the 3 vocabularies already published to 569.

R. with 25 words and C. with 35 at 28 months bring the average vocabulary for this age from 469 words to 359.

The average of the published vocabularies for 30-month-old children is 1,060; D. with 538 words and C. with 117 reduce it to 851.

DISCUSSION

Can we find any explanation for these children's retardation in speech?

Bateman ('17) says: "It is difficult to believe that a child who has made no attempts at articulate speech by the eighteenth month, and still more so by the twenty-fourth, can be entirely normal in all other respects. General feebleness of health, poor powers of hearing, defects in or lack of development of the vocal organs, or adenoids may lead to disability in speech." As to health, R. suffered from under-nourishment from the age of 8 to 11 months, C. had a serious illness from the age of 7 to 9 months, and M. was a delicate baby. However all these children were well and sturdy most of their lives. D., G. and W. had exceptionally good health and U. surely looked as if she did too. M's brother was as delicate as she when a baby and yet he talked early. The matter of ill-health might be remotely involved in only 3 of the 7 cases, and it does not seem probable that it had anything to do with the retardation in speech.

None of these children have suffered from "poor powers of hearing, or defects in or lack of development of the vocal organs." As to adenoids, D. and R. had none, although their sister who talked early, has small ones; C. has had none, while her brothers who talked early, had to be operated upon for this cause. So far as I know, none of the other children of this study have had adenoids. The boy, L., had none, while a brother and sister were seriously troubled with them.

Dr. Wm. Boyd in a personal letter speaks of a child who was slow in talking and considers the matter one of phonetics for "the majority of her vowels are the back vowels oo, oh, aw, ah and the mixed vowel uh." In R's 26-month vocabulary of 12 words all the vowels were back vowels except one mixed; yet in her own spontaneous sounds and expressions she used the front vowels about one-third as often as the back vowels. Of the 14 new words learned in the next 2 months, 8 employed back vowels, 2 mixed and 4 front. D's first 14 words showed 7 back vowels, 1 mixed and 6 front. R. apparently is in accordance with Dr. Boyd's observations, while D. was not. Of the other children I cannot say, for it takes most careful noting of the exact pronunciation to report on a matter like this. However, even when this holds true, does it take us back to the underlying cause; what is the reason that the front vowels should be more difficult for one child than for another? May it not be just another *evidence* of retardation in speech, on the same par with a small vocabulary, and not an *explanation* of the retardation?

Can general mental retardation account for the backwardness in speech of these children? With all of them their ability to understand has far outstripped their powers of expression. The parents testify that they are as intelligent as other children of their age despite their lack of loquacity. In some practical matters R. knows more than either of her sisters did at her age. D's intelligence quotient according to the Binet test was 133 at three and a half years, while her sister E's was 120.

There is one respect in which four of these children were slower in developing than their brothers and sisters, and that was in appreciating rhymes and stories. C. and M. were later than their brothers in this phase. D. has been slower than E., and R. is the slowest of all our three children. With D. and E. there has come a very definite period when they liked Mother Goose recited to them with no pictures as added attraction; if they were inclined to be restless, the verses would command their rapt attention, whereas before there was no calming effect whatever. With E. this period came at 18 months, with D. at 23 months and it has not yet arrived with R. who is 28 months old. However, at 26 months, she just began to pay attention to verses when they were read out of picture books and at present demands a good deal of reading of rhymes and the Potter stories. E. liked the "Three Bears" and "Red Riding Hood" at 22 months but D. did not care much for them till she was 35 months old. W. enjoyed these stories at 3 years.

We have no criterions for this phase of mental development except Jegi's child ('01) who outgrew Mother Goose before she was two, and she can scarcely be considered normal, so we cannot tell how these children would compare with a large number of others. It is perhaps natural that these children who were slow in learning to talk should also be slow in understanding or caring about more difficult words, yet at the same time they might be as intelligent as others in other directions. At any rate we are safe in concluding that general mental retardation does not apply in any of these cases.

Ill health, defects of hearing, malformations of the vocal organs, adenoids, phonetics and backwardness of intelligence do not seem to explain the retardation in speech of these children. The only constant phenomenon that appears to be associated in all seven cases is the more or less marked ambidextrous tendency. It is well known that there is an intimate association between the hand center and speech center in the brain and that normally the speech center is located in the dominant side of the brain in close connection with the hand center. An attempt to change the dominant hand often disturbs the speech mechanism, causing stuttering, stammering, lisping or sometimes a delay in the appearance of speech. These seven children showed a prolonged state of uncertainty as to which hand should lead and in the meantime they did not talk. An explanation of the coincidence of retardation in speech and in the ascendancy of the right hand might be that as long as the dominant hand center was not definitely settled the speech center could not be located. Yet it is impossible to know the exact relationship of these two factors; they might both be the results of some other cause.

This coincidence of ambidexterity and delay in learning to talk does not occur in all cases. There are of course many other reasons for retardation of speech in individual children. For instance, R. at present has practically outgrown her ambidextrous tendency, yet she hardly talks at all. Others may talk early and yet be ambidextrous. Two such cases have been reported to me. One is a girl who at 27 months talked a good deal, yet she used her left hand almost as much as her right despite her parents' corrections. A month later, however, she was practically right-handed. The other is a boy now 12 years old, who was ambidextrous till after he was two; the parents made no effort to encourage right-handedness, which he developed later. He was an early and distinct talker.

We have an almost untouched field in this subject of the relationship between speech development and the use of the hands. We need a large number of studies on children and particularly on those who are more or less slow in talking and who have hitherto been almost wholly neglected by observers, before we can hope to find the underlying causes of the differences in speech development in different children.

BIBLIOGRAPHY

References on Handedness.

BALLARD, P. B. 1912. Sinistrality and Speech. *Jour, Exp. Ped.* I, 298-310.

BALDWIN, J. M. 1897. Mental Development in the Child and the Race. N. Y. Macmillan. 497 p.

BOLK and LUEDDEKENS. 1900. Rechts u. Links händigkeit. Leipsig.

DEARBORN, G. V. N. 1910. Moto-Sensory Development. Baltimore, Warwick & York. 212 p.

JONES, W. F. 1915. The Problem of Handedness in Education. *Proc. Nat. Educ. Ass.* 959-963.

MAJOR, D. 1906. First Steps in Mental Growth. N. Y., Macmillan. 354 p.

Meyer, M. 1913. Left-handedness and Right-handedness in Infancy. *Psych. Bull.* Vol. 10, 52-53.
Nice, M. M. 1915. The Speech of a Left-handed Child. *Psych. Clinic.* IX, 115-117.
Scripture, M. K. Glogau, O. and Be Bra, A. H. 1917. Left-handedness as an Etiological Factor in Speech Defects. Laryngoscope. XXVII, No. 3, 157-169.
Smith, L. G. 1917. A Brief Survey of Right- and Left-handedness. *Ped. Sem.* XXIV. 19-35.
Stier, E. 1911. Untersuchungen über Linkshändigkeit. Jena. 400 p.
Whipple, G. M. 1911. *Jour. Educ. Psych.* II, 574.
Wooley, H. T. 1910. The Development of Right-handedness in a Normal Infant. *Psychol, Rev.,* Vol. 17, 37-41.

References on Vocabularies.

Bateman, W. G. 1916. The Language Status of Three Children at the Same Ages. *Ped. Sem.* XXIII, 2, 211-241.
—— ——. 1917. The First Word. *Ped. Sem.* XXIV, 3, 391-398.
Bohn, W. E. 1914. First Steps in Verbal Expression. *Ped. Sem.* XXI, 578-595.
Brandenburg, G. C. 1915. The Language of a Three-Year-Old Child. *Ped. Sem.* XXII, 89-120.
Gale, M. C. & H. 1900. The Vocabularies of Three Children of one Family to Two and a Half Years of Age. *Psych. Studies,* No. I, 70-117.
Grant, J. R. 1915. A Child's Vocabulary and its Growth. *Ped. Sem.* XXII. 183-203.
Holt, L. E. 1910. The Care and Feeding of Children. Appleton. 195 p.
Jegi, J. I. 1901. The Vocabulary of a Two-Year-Old Child. *Child Study Mo.,* VI, 241-261.
Mateer, F. 1908. The Vocabulary of a Four-Year-Old Boy. *Ped-Sem.,* XV, 63-74.
Mickens, C. W. 1897. Vocabulary. *Child Study Mo.,* III, 203-205.
Nice, M. M. 1915. The Development of a Child's Vocabulary in Relation to Environment. *Ped. Sem.* XXII, 35-64.
—— ——. 1917. The Speech Development of a Child from Eighteen Months to Six Years. *Ped. Sem.* XXIV, 204-243.
Pelsma, J. 1910. A Child's Vocabulary and Its Development. *Ped. Sem.* XVII, 328-369.
Tracy, F. 1895. The Psychology of Childhood. Boston. Heath. 219 p.

SCHOOL CHILDREN AND FOOD PRODUCTION

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Of all the problems that have engaged the minds of the American people since the entrance of this country into the great world-conflict, there is no subject that is of greater importance for the successful prosecution of the war than that of increasing the food supply. Beside men and ammunitions we have come to realize that food is the third member of the trio which is absolutely indispensable in shaping and determining the issues of war. Without an adequate supply of food no nation can carry the war to a successful termination, no matter how efficient its military machinery may be. The armies in the field as well as the civilian population at home must be fed. Men of highest authority, with full knowledge of the war conditions, have repeatedly told us that this war must be fought not only in the front-line trenches but also on the farms. "Food will win the war." Any consideration of military efficiency without giving special heed to the problem of food is inadequate to the issue.

To increase the food production the schools in this country have undoubtedly a new task to perform. The course of nature study taught in a pedantic, cut-and-dried fashion can be transformed into practical gardening work with great advantage both from the standpoint of increasing the agricultural output of the nation and from the standpoint of increasing the educational value of the public school. The boys in the upper grammar grades, in the intermediate schools, and in the high schools who may not be called upon at once to enter actively into war service in the field can be made fully as useful on the farm. America to-day is mobilizing all her resources to meet war needs. Public schools must appreciate this situation and rise to the task of meeting the real needs of the nation. They too are to mobilize. They are called upon to cultivate the patriotic spirit of service in the American youth. They can make themselves a very useful institution to the nation in this time of national crisis by addressing themselves to the task of directing the boy and girl power of the nation to productive service. There is no war measure in which the schools can take part more effectively than in making boys and girls render service in food production.

Indeed, there is no national service within the power of the children which is more vitalizing and ennobling, fuller of purposeful appreciation of collective responsibility, than planting potatoes and vegetables in the vacant lots and in the back yards, picking fruits in the orchards, and driving teams on the farm. War has offered an unprecedented opportunity to the schools to bring their activities closer to life. Have schools in America proved themselves equal to the task?

Realizing the important part which school children can play in food production, the writer has included in a questionnaire sent out to school superintendents in different parts of this country the following two questions:

1. How have your schools aided in food production (*i.e.*, gardening, school or home)?

2. Have you made any provision for exempting children in the upper grades and high school from school attendance for farm work, and if so, how many, under what conditions, and for how long? Did the result of such action seem to justify it, and what is the sentiment?

The answers to these questions so far received are most suggestive as to what the schools have been doing throughout the country. In some places, school grounds have been plowed up and put under cultivation; garden clubs have been organized; vacant lots in the cities have been planted; boys of the upper grades and high schools have given their assistance upon farms where help could not be secured;—these and many other things are being done in practically every state of the Union. From Michigan in the north to Florida in the south, from Maine in the east to California in the west, letters have been received from local school authorities stating what they have done and what they expect to do along these two lines. For the convenience of presenting the subject, I shall treat the problem of children's part in food production in two sections, namely, (1) school and home gardens, and (2) school children and farm work.

1. School and Home Gardens

No satisfactory statistical report can be made on this subject on account of insufficient data. But enough has been received to show that there has been a nation-wide movement in school and home gardening since America entered the war. I shall introduce the subject by giving a few typical examples of what has been done in some states.

California.—According to the statistical study made by Arthur H. Chamberlain, Chairman of the Committee on Thrift

Education of the National Council of Education, there were 2,625 acres under cultivation last year in the 37 school districts investigated. Beside this there were thousands of school gardens and home gardens aggregating 800 or 1,000 acres. Schools in the hilly regions, in the large cities, and in the agricultural, fruit and dairying districts have in general all made their contributions toward food production according to the facilities at their disposal.

The gardening work done by the public schools in Los Angeles may be considered significant both for the amount of land cultivated and the systematic effort put forth by the school authorities. Just a few days after the beginning of the war the superintendent sent to the principals a circular which outlined certain preliminary steps and notified them of the appointment of additional continuation teachers to supervise home garden projects. Within six weeks the school department made a complete record of many vacant lots and their ownership, adequate provisions for giving expert advice on soils and planting, for distributing plants from school gardens to the various home gardens, for lending tools to those unable to purchase them, and for giving lectures to Parent-Teacher Associations and other public bodies. As a result of this effort, 14,012 pupils in the elementary schools alone became regularly engaged in gardening outside of school hours. The amount of additional acreage put under intensive cultivation by children in the elementary schools was 1062.16 acres.

Not only the elementary schools, but the high schools have also been at work. In Van Nuys High School, situated in San Fernando Valley, the boys interested in athletics agreed by unanimous vote to plow up their baseball fields and to plant beans. Money for seed beans was voted by the student body. Work in preparing the soil and in planting was done by the boys. The crops harvested from one baseball field amounted to 2,417 pounds of cleaned beans. Plans have also been made to replant the baseball field in this spring.

Examples of this kind are trivial in themselves, but significant in their mass. It has been learned that county and city school authorities throughout the state are endeavoring to co-operate in every possible way with the agricultural colleges, the State Council of Defense, and other state agencies in food production this year. It is their ambitious program that every one of the pupils in the elementary and high schools shall be made to do his part in increasing the agricultural output of the State.

Connecticut.—In the city of Stamford, every school has been conducting a garden or gardens, beside many home gardens that were started because of school initiative. In the same city the high school had a potato farm cultivated by the students last summer, and credit was given for the work done.

In the city of Hartford, a Vacant Lot and Home Garden Committee was formed last year. School children had a large part in the work of this Committee which cultivated 1,400 vacant lot gardens and hundreds of back-yard gardens.

In some cities of this state special supervisors have been appointed to supervise the gardening projects. For instance, the school authorities in the city of Waterbury appointed a special instructor to supervise the work of 2,500 pupils who had gardens last year. In the city of Meriden, 850 children had gardens which were cultivated under supervision.

Taking the state as a whole, the amount of gardening work done by the school children is very noteworthy, but I believe there is still a good deal more to be done.

Illinois.—The work done in the city of Joliet is typical. The Rotary Club plowed all the available vacant lots in the city, and school boys and girls took charge of their cultivation. This work was done under the direction of the school authorities. The food products were sold and the receipts divided. half going to the owner of the land and half to the students who cultivated it. In another suburban community, 980 children out of a total of 3,000 cultivated home gardens. From the answers to my questionnaire on this subject, there is enough evidence to show that much gardening work was done last year throughout the state, and more extensive and systematic work will be done this year.

Indiana.—Very systematic work has been done in school and home gardens in this state. Indeed, the whole state has been organized for this purpose. From the state office we learn that more than 80 teachers have been employed to supervise boys and girls in their projects for crop production and food conservation. The county agents in each of the 42 counties have made definite plans for organizing and supervising agricultural and garden clubs. It is estimated that 40,000 boys and girls will be engaged in food production and conservation this summer. This may be suggestive of what was done and what is being done in that state.

Iowa.—Two typical cases may be mentioned. In answering my questionnaire, the superintendent of Sioux City says: "We maintain regular garden work in the city during the summer. We have a garden supervisor who gives his whole time to this work and has the help of several assistants. We maintained successfully somewhere near one thousand gardens during last summer, and produced about 40,000 dollars worth of food productions."

From a rural school district, the superintendent writes: "School and home gardens were planned and carried out last summer under the general supervision of one of the grade school principals. In the fall an exhibit of the products from these gardens was held, and prizes were awarded for the best exhibit. This work will be carried out to a still greater extent next summer, as the interest in this work throughout the community is very general."

Kentucky.—The statement from the superintendent of Louisville may be suggestive as to what is done in this state. He says: "Shortly after the declaration of war the Board of Education extended the school and home garden work. A director was appointed on an all-year basis and a number of assistants were provided. For this work an annual appropriation of $3,700 has been made. During the past summer this work was very successful and plans are on foot for securing more extensive results in 1918."

Massachusetts.—On account of the unproductive soil in most parts of this state, gardening in general did not have very successful results last year. "We attempted a considerable amount of gardening work last year," said one city superintendent, "but found that the soil available was unproductive and that the results, with few exceptions, were not satisfactory." However, the work in school and home gardens has been carried on with zeal and enthusiasm by different school systems. In the city of Newton, 91 school gardens on twenty different plots of land have been established and maintained in addition to 1,400 home gardens. This work was under the direction of the supervisor of Nature Study and School Garden Work. In the city of Haverhill, it was estimated that the work of the schools contributed to food production approximately $10,000. In the city of Lynn, the school authorities conducted about two thousand home gardens and about a dozen school gardens beside.

Michigan.—In Grand Rapids, about 1,300 children were organized in the garden clubs and had home gardens. These were under the direction of the County Farm Bureau with four district supervisors in the city. From the superintendent of that city we learn that plans for the coming summer are now being made to have at least two thousand children organized in the garden clubs, each with a home garden.

In Detroit the Public Recreation Commission has organized garden clubs to cultivate vacant lots. The work has been under the direction of playground workers. There were 1,200 gardens and 715 potato patch assignments. Potato patches were plowed and the seed furnished at cost. There were exhibits and competitions among the various classes and gardeners.

In the city of Jackson, school gardens have been everywhere encouraged. Beside the regular school gardens, there were 2,546 children, or 48% of the entire school enrollment, that participated in gardening enterprises.

New Jersey.—The schools of the entire state have been mobilized for food production. The Assistant Commissioner of Education heads the work of the Junior Industrial Army of New Jersey, organized last year. This Junior Industrial Army consists of three divisions, agriculture, home gardens, and girls' service. People in different parts of the state are called upon to organize locally, and each county superintendent has been made responsible for the work of food preparedness in his own county.

The typical garden work in this state may be said to have been done by the garden clubs in the schools of Englewood. They were organized during the summer of 1916 and were directed by the local board of education and the superintendent of schools through a supervisor of gardens employed for this special purpose. They were not a war-time creation, but their organization has been so efficient and practical that it may not be out of place to describe it very briefly.

Organization—Children of all the schools who elect the gardening work must obtain registration blanks from the supervisor of gardens and fill them out. For every participant the approval of the principal of the school is necessary. The child thus registered is expected to carry out his project under the supervision and advice of his parents and the supervisor. Beside the caring of the garden he is required to keep a careful record of all the activities connected with it.

For the convenience of supervision and instruction the children registered are organized into clubs of about 15 members each, of about the same age, of the same sex, and from the same school.

The members of each club compete among themselves for inexpensive prizes which are awarded on the basis of achievement, three-fourths of the credit being given on the garden work and one-fourth on the record kept. The one who has done the best work in each club is given a button of rolled gold. The second best is given a button of sterling silver. All those whose work comes to the average of 75% are given bronze buttons of the same size and of the same design. The one who has done the best work among the members of all clubs is given another button made of solid gold. The school having the highest average among the garden club members attending it is given a banner.

Instruction—One of the most significant features in the gardening work in Englewood is the instruction given to all the children in different seasons. During the late winter and early spring the method of class-room instruction is followed. Lessons on different garden practices and methods, seed-testing demonstrations, and illustrations of handling garden tools are given. Automobile trips into different vegetable, fruit, poultry, dairy, and ordinary farms in the rural districts are usually arranged in order to give the children a still broader view of vegetable gardening and agriculture in general. These trips have proved greatly enjoyable and inspiring as well as instructive to the children.

In addition to this theoretical instruction a demonstration garden has been established. This was planted last year with three varieties of sweet corn, three of tomatoes, two of eggplants, two of peppers, two of turnips, three of radishes, endive, and potatoes. It has served as a working place for several boys who were chosen on a competitive basis to do the work.

This general plan of organization and instruction is very unique in many respects. The writer strongly recommends that some such plan may be adopted by other cities with advantage.

New York.—Great stress has been laid on gardening work by local school authorities throughout the state. Instead of enumerating what has been done in some of the cities I shall describe the garden system of the city of Elmira.

In Elmira the gardening work has been efficiently carried out by the Chemung County Achievement Club. Membership in this club is open to all boys and girls in Chemung county between ten and eighteen years of age. Pupils who wish to join the club must register their names at school, pass a brief test, and start one of the projects, such as poultry raising, potato planting, gardening, and handicraft; each one of these has been minutely planned and outlined. In every case the written consent of parents or guardians must be procured before enrolling.

Group leaders, two in each school, a boy for the boys and a girl for the girls, are chosen by the members. Assistant group leaders may be chosen, one for each room.

School fairs are held in the fall at which exhibition of the products, accompanied in every case by a final report and a brief story of how the work was done, is made by all the members of the club. Prizes are also to be awarded on the basis of achievement.

One of the most significant features of the whole system is that the projects are planned and outlined for a period of years. For instance, the gardening project covers a period of two years. What is to be done has been mapped out very carefully for the entire period. In order to show how the plan has been worked out I shall quote the following:

" Garden. Project covers two years.

" First year—April to October. Planting and caring for a plot of ground (at home, if possible), containing at least 500 square feet; raising the following vegetables: head lettuce, sweet corn, tomatoes, potatoes, cabbage, beets, onions, and cauliflower. Exhibiting one of each at the school fair, with a final report and story of work; making five monthly reports.

" Each one choosing this project is expected to enrich the plot with at least six bushels of well rotted manure or compost, and to prepare in October a compost of leaves and other waste materials for next year's garden.

"Second year—October to September. Collecting in October at least twenty bushels of leaves (packed), or five bushels of compost, piling them in the back yard, covering them with soil and tramping them down.

" Sowing Stone tomatoes in boxes at home during February.

" Planting at least 500 square feet of either Golden Bantam corn or Stone tomatoes, with a crop of early dwarf garden peas grown between the rows.

" Making five monthly reports and exhibiting either best stalk of corn with ears on it or most prolific tomato vine with ripe fruit on it."

Pennsylvania.—In the city of Lancaster, two schools maintained school gardens last summer. Beside this, the work of all school children taking part in such matters was in connection with the work of their parents in the war gardens of the city, in which some fifty or sixty acres of land were cultivated to a large extent by employees of the various industries of the city. Plans are being made to enlist many of the older boys of the schools in this work this year in addition to those who will work with their parents.

In the school district of Reading, the gardening work was signally successful. Last year over six thousand pupils, grade and high, successfully tilled gardens, and more than two thousand of them received buttons for very meritorious work. It was estimated that the value of the product was considerably more than seven thousand dollars.

Oregon.—There is a complete organization of boys and girls in each county under the auspices of the boys' and girls' club work. These boys and girls are carrying out the different projects of poultry raising, egg raising, growing corn, potatoes, and canning and baking. The Home Guard Girls are doing a great deal of work along the line of gardening and planting potatoes. A committee in every town in the state directs all the work.

Wisconsin.—Very significant gardening work is being done in the city of La Crosse. The local Garden Committee expects to have every child in the schools take home with him a card which his parents will be asked to fill out and which will give information as whether or not the family has a garden, the size of it, and whether or not the family is cultivating a vacant lot. The vacant lot assignments will be made through the schools to those people who are represented in the schools. On account of peculiar soil conditions in that city, the garden committee has prepared literature and special directions for garden work. This literature was distributed in the schools the first week in March, and has been made the subject of study and recitation. The pamphlets are also to be taken into the homes. In addition to this, lectures on agricultural subjects have been held in the school buildings for the adults.

I have tried to present in the above few pages a mosaic picture of what has been done in school and home gardens in some states of the Union. Here I wish to emphasize that Gardening can no longer be considered only as a pedagogical measure, but must be regarded as a national necessity. The first school garden in the United States was started at Roxbury (now a part of Boston, Mass.), in 1890. From that time on the school-garden movement has spread very rapidly. According to the statistics collected by the Bureau of Education in 1916, we find that 1,220 out of 1,572 city superintendents, or 78%, reported that they were encouraging some form of school-directed gardening among the children of their schools. The great diversity in the organizations, systems and accomplishments in different parts of the country has been emphatically pointed out by the Federal Commissioner of Education. In some cases school and home gardening has become an integral part of the school systems, complete departments of school and home gardening or of gardening and nature study have been maintained and separate appropriations set aside for the work. In other cities, school boards have been willing to provide instructions in garden work and the supervision has generally been left to principals and teachers who either offered their services gratis or were paid a small additional salary for the extra work in the garden. In still other cities, encouragement in gardening has meant merely talks on gardening by teachers and principals or the distribution of seeds in bulk, and nothing more was done. These diverse conditions of gardening work in the public schools have also been confirmed by my recent investigation. But the result of my own inquiry has convinced me that, old as the gardening movement has been, the war has given it a new value and a new vitalizing force for its development. Neither the school garden as a part of school activity nor the home garden as an adjunct to the school is a new idea, but the economical and educational values of both are just beginning to be appreciated by the necessity of war. As President Hall says: "The war is a great shell shock to the world; it shatters and transforms the old institutions and beliefs." It has taken a great shock, like this war, to bring home to the schools in America, clearly and forcibly, the fact that gardening is one of the means of hitching the schools to the actual conditions of life.

In general, the economical value of gardening has not been fully appreciated by the school men in this country. Indeed, quite a few school superintendents have seriously questioned the value of gardening in food production. Here I can say very positively, without fear of contradiction, that many million dollars worth of agricultural products, vegetables, and fruits will be produced annually by the school childen in the back yards of their homes and on available vacant lots, if gardening activities are encouraged, organized, directed, and supervised by the school authorities. Furthermore, the earnings from the garden activities will represent a clear gain for neither the land nor the labor would otherwise be utilized. To substantiate my contention I wish to quote at length the findings of a survey concerning the possibilities of school and home gardening made in Richmond, Indiana, two years ago. The findings of the survey are summarized as follows:

> "Homes—Although located in the center of a farming region, the prices paid for vegetables are comparatively high. Prices are standardized by present methods of selling. Considering the low average labor income, the amount spent for vegetables and small fruit foods is large, an average of $138.87 per year for a family of five persons. About 30% of the families have home or vacant-lot vegetable gardens, but the methods of planting and cultivation are not intensive, and the money value of the product is small. Of all the homes in the city, less than 10% lack space on which to make a practical kitchen garden; 30% have enough land to produce all the vegetables for the family during the productive season of the garden; and in 60% there is enough to produce fresh and canned vegetables and berries for the entire year and, in many cases, to have a surplus to sell. There is enough vacant

ground so that all of those who are without land could secure enough for a family garden. In most cases the use of vacant lots can be secured free of charge, but when it has to be rented the price of $1 per lot is so small that it would have little effect in decreasing the profits.

"Schools—The school year in Richmond is nine months in length and the school day five hours. The children are out of school nearly half of the week days of the entire year and three-fourths of the days of the garden season. On school days less than half of the daylight hours are spent in the classroom. All of the children of the city might have occupations two hours per day on school days and four on Saturdays, holidays, and in the summer vacation and yet have enough time left for play, reading, music, and other special studies. At the present time only 9.1% of the elementary school children have regular productive occupation during vacation, 7% irregular employment, and 4.4% after school hours. In the Garfield School 10% are engaged in earning money before and after school and 25% during the vacation. Of the high school students reporting, only one-fourth have vacation occupation.

"Of 889 children in the elementary schools reporting on home garden space, 6% were without home lots, 39% had an average of 400 square feet, and 55% had 1,000 or more square feet.

"In several cities where home gardening was conducted under the direction of the public schools, the children were able to produce a net profit of 10 cents per square foot. The children of the nine elementary schools of Richmond should be able, on the basis of the number of square feet reported, to earn from their gardens a total of $62,820, or an average per child of $70.66. The home garden income from the 516 reporting from the Garfield School would be $34,740, or an average per child of $67.32."

Based on the Thirteenth Census Report we can safely say that there are about 12,000,000 school children between the ages of 9 and 16 in this country. Assuming that one-half of this number, or 6,000,000 pupils, should carry on garden work and that they should make an average profit of $50, the result would be a total profit of $300,000,000. This is by no means an over-estimation, both from the standpoint of the possible number of pupils who may undertake the work, and from the standpoint of the possible earnings. Reports at hand show that many city school pupils have made from $100 to $200 from their gardens. Under proper direction and with proper assistance, school boys and girls in the cities, towns, villages, suburban and manufacturing communities in the United States might easily earn $100 from their gardens annually. In this period of crying need for the increase of food supply, what greater contribution can the public schools make to the nation than by directing the surplus energy of their boys and girls into this kind of productive activity!

Beside this economic value, the educational value of gardening is threefold. In the first place, gardening gives the child the best kind of moral training at the period when the school closes its door in the summer for vacation. Statistics collected by the Bureau of Education show that about 85 per cent of the city children throughout the country remain at home during the long summer vacation, without proper employment for any large part of their time. "Many of these children at the close of school wander about aimlessly and form themselves into gangs, and give outlet to their energies in ways that are not acceptable to other members of the community or beneficial to themselves." Gardening is just the kind of work which will make a strong appeal to children's interests and meet their needs. It gives them something to do; keeps them off the streets and out of mischief when they are idle during the long vacation. It teaches them the private care of public property, economy, honesty, appreciation, concentration, self-government, civic pride, justice, the dignity of labor, and love for the beauties of nature which they can never have any opportunity to appreciate in the alleys, gutters, and dirty and noisy streets. Prof. James said: "Manual training is the most colossal improvement that ever came into the schools of America, because the boys learn to work together, to look at each other's work, and to help each other work, and become co-operative instead of selfish little imps who are trying to get ahead of their fellows and crow over it." Gardening, school or home, if properly organized and directed, possesses all these advantages of manual training with the added ones of the employment of children when they need something to do, utilization of vacant places which would not be utilized otherwise, work in the open air which is most essential for the health of the growing child, and opportunities for appreciating the beauties of nature which are often denied the children in the city.

In the second place, gardening gives the child a knowledge of things which can not be obtained in the class-room. What he learns in the garden is the knowledge of nature, of real life, instead of dead books which he can not comprehend. Here he learns the nature of the seeds, their growth, appearance of leaves, flowers, enemies of gardens, such as bugs, birds, worms, flies, weeds, etc., the nature of the soil, and the seeds that thrive best in it. He learns to use spade, rake, and other agricultural instruments by actually handling them. He learns business method by planning, managing, selling the products and recording the results of his work. He learns through his own labor and experience his own failures and successes. If "learning to do by doing" is the slogan of modern education, there is certainly no better means of realizing it than gardening work.

In the third place, gardening gives the child the best kind of physical exercise which is most conducive to his healthy growth. This may sound trivial and commonplace, yet it is one of the most significant principles which modern pedagogy can never over-emphasize. Exercise in the open air and sunlight has been regarded as a great health invigorator; indeed, it has always been recommended for tuberculosis, particularly in its incipient stage. The garden affords an excellent athletic ground to the growing child, where he can utilize his surplus energy in a healthy and productive manner.

In addition to the economical and educational values there is one thing more I wish to emphasize; that is, gardening offers the very best means of teaching patriotism and loyalty in this time of national crisis. To-day is the day of hero-worship; the child also wants to be a hero. When young men are marching along the streets with banners floating and martial music sounding, when the young women are conspicuous in the service of the Red Cross or wearing badges of Army Relief Corps, small boys and girls thrill with a desire to play their parts as national heroes and heroines and to do something beyond the four walls of the school room. Any attempt to prevent this youthful ardor from expression will be worse than useless. Whenever there is an energy, there must be an outlet. The energy of the child aroused by war must be provided with some means of expression. I am quite convinced that gardening offers the very best means of directing this energy and enthusiasm of the child in the right way to the right ends, if the necessity of cultivating gardens is explained to him in terms of patriotic service. Make the child a part of the patriotic force of the country. Tell him that to work in the gardens is just as important and valuable a service to the country as to fight in the trenches in France. Appeal to his spirit of patriotism which is already crying for action. Can there be any doubt that gardening can be made the most vitalizing subject in the school curriculum in war time?

After this brief statement of the values of gardening I wish to offer some practical suggestions as to how it can be organized and directed in a most practical and efficient manner.

1. A thorough-going garden survey should be immediately made by the school authorities. In practically every American city there are vacant lots and back yards aggregating many acres of land which can be turned into productive soil. The school authorities must have a clear knowledge of the local possibilities before any extensive gardening program can be made.

In making the survey I should also like to suggest that the outline on this subject prepared by the Bureau of Education sometime ago be closely followed. The following points must be carefully investigated and recorded:—the number of children in each home between the ages of 9 and 16 years, number of boys, number of girls, occupation of these children during the previous summer, income from their work, amount of land available, estimate of the value of the products that may be grown, character of the soil, amount of garden work being done, who cares for the garden, opportunities for raising fruit, means of securing the vacant lots from the owner, the amount of rent to be paid, means of securing agricultural implements, the probable amount of seeds to be purchased, etc. This is the first step which ought to be taken by every city school authority.

2. A special teacher with special training in gardening should be employed by every school having more than one hundred pupils of garden age. It is desirable that such a gardening teacher should not be expected to take care of more than two hundred children, and should be employed twelve months in the year, with four weeks vacation distributed in the four seasons. The salary of this teacher should not be less than $1,500 a year.

When the school is in session this teacher should be expected to teach elementary science, nature study, and sometimes even manual training, and spend at least two afternoons a week, say, Wednesdays and Saturdays, in visiting the children in their homes and directing their work. During the vacation months he should spend all his time, six days a week, in visiting the children and giving them such instruction and help as they most need. He should arrange to meet all the children at least once a week during the summer in order to discuss with them problems which may rise.

3. An age-limit should be made for the children who elect gardening work. It is the writer's opinion that children below 9 years of age should not be drafted into the army of little garden workers, although some kind of encouragement should be given to them for their productive activity along this line conducted in the form of high grade play.

4. For the convenience of supervision and instruction all the children undertaking the work should be organized into small clubs. In this case the writer strongly suggests that the plan of Garden Clubs in the schools of Englewood, New Jersey, should be adopted; that is, to organize the children into clubs of 15 members each, of about the same age, of the same sex and from the same school. By this plan the children may have opportunity to work together, to look at each other's

work, and to help each other work, and their sense of healthy competition, co-operation, and goodfellowship may thus be developed.

5. A school exhibition of garden products should be held sometime in September in every city, and lectures on the achievements of the children should be given. It is at this time that the parents of the children and other people who are interested in this work should have a complete knowledge of what has been done and of what more is to be done in the future. Inexpensive prizes may also be awarded to the children who have done the best work. But the writer would hesitate to recommend the plan of giving prizes so profusely as was done in many places last year.

No uniform program can be made for all the cities and towns in this country, but the above suggestions should be incorporated in any plan which any city may adopt. They are the general principles, while the detailed program must be worked out by the local school authorities in order to meet local conditions.

II. School Children and Farm Work

At the time of this writing about 150 answers to my question on this subject have been received from the county and city superintendents in different parts of the country. Practically all school systems thus heard from have made some provision for exempting children in the upper grades and high schools from school attendance for farm work. The conditions under which the children were exempted were so different and the results obtained were so diverse, that it baffles any statistical treatment on the subject. For this reason I shall try to discuss some salient points of the problem on the basis of my inquiry.

Age-limit

Very few school systems which have made provision for releasing children for farm work have taken the problem of age-limit into consideration. Many cities as well as rural districts exempted children of the upper grades and high schools to work on the farm last year, without any regard to their age. Many others exempted children at the age 14; and still others even exempted children at the age 12. In the state of Kansas, the State Board of Education last year authorized the local boards to excuse children of any age, at any time, and for any length of time, by adopting a resolution which reads as follows: "Resolved, That superintendents and principals be advised that in view of the war situation and the food crisis, the State Board of Education will approve of granting a full year's credit to pupils who have passing grades and who find it necessary to withdraw from school before the end of the school year either to enlist in the military service or actually engage directly in food production." The state superintendent of Missouri took similar action with the exception that an age-limit of 14 years was specified. In a letter to the local superintendents last year, he said: "Excuse at once from your high school all boys over 14 years of age who will go to farms and work. Give them full credit for their year's work at the end of the school year, with the standing they have at present. Do not let any one impose on you, but have the boy who gets the credit give evidence satisfactory to you as to his work on the farm. Include boys who live in the country, and boys who will go to the farm to work. Extend the privilege to such girls where you deem it desirable." In the state of Pennsylvania, the statement from the superintendent of the city of New Castle is very significant. He says: "Under the authority of the State Board of Education last year, children over 12 years of age, who had done satisfactory work, were released before the close of school for farm labor. . . . The farmers do not take to it. They were still clamoring for experienced laborers. The town people and the children, I fear, consider it somewhat of a lark."

Action of the similar nature was taken by many other states last year. To my mind, such action is ill-advised. It is short-sighted patriotism which tends to exploit the children to their disadvantage and that of the nation. England has learned many costly lessons along this line, and found that her policy of recruiting agricultural and factory workers from school children was a policy of mortgaging the future generation for the exigencies of the present. Great efforts have been made by the British Board of Education to check the continuance of such short-sighted policy and to put a ban upon the local board in exempting children from school attendance under 14. In spite of all these efforts, 15,753 children under 14 were reported as excused from school for farm work in England, in May, 1916. What must be the situation in some of the states in this country where no restrictions on exempting children was made? America must profit by the experience of England and avoid some of the serious mistakes which England made at the beginning of the war. School superintendents and principals must all bear in mind that the compulsory educational laws and child labor laws have been made after careful deliberation and long political struggle, and any effort to suspend them because of the conditions of war will do more harm to the nation than good.

Suggestions to the effect that children under 16 should not be sent away from home to work on farms have been made by The National Child Labor Committee and the U. S. Boys' Working Reserve after a careful study. This minimum age requirement should be adhered to by all local school authorities whenever the problem of releasing children for farm work comes up for consideration. The reason for this proposition has been very ably stated by William E. Hall, National Director of the U. S. Boys' Working Reserve. Thus he says: "We arrived at the decision to make the minimum age 16 for boys who left home to work on farms after a careful examination of all the conditions surrounding farm life. . . . After receiving the reports on the work done on the farms by boys during the year 1917, we believe that our decision was right. The U. S. Boys' Working Reserve deals almost entirely with the city boy who, in many instances, is leaving his home for the first time to live amid strange surroundings. It is most important that he be mature enough to take care of himself under all conditions and that he be strong enough to stand the rigors of hard work on the farm."

Avoid Interruption of School Attendance

In taking action on exempting children we must always bear in mind that to go to school regularly is both their duty and right. They are the assets of the nation. We can not afford to infringe their birthright of going to school under any circumstance. If the necessity of this terrible war compels us to let them work on the farms in order to save the crops, we must see to it that their school work is as little interfered with as possible. From the investigation made by the National Child Labor Committee on the causes of absences from rural schools in Oklahoma, we have come to know to what extent we have neglected the enforcement of school attendance laws in favor of farm work even in times of peace. In the state of Oklahoma the law requires children between 8 and 16 to attend school at least 66 per cent of the time it is in session. But the investigation shows that in some school districts only 66 per cent of the children met this modest requirement of the law. Of all the causes of absence from school, farm work was by far the predominating one. Furthermore, only 51.9 per cent of the farm-working absentees attended 66 per cent or more of the time. In other words, 48.1 per cent of them attended the school less than two-thirds of the time they should be there. This was the condition in time of peace. What special precautions do we have to take in time of war, when the exemption of children for farm work is everywhere considered as a measure of national necessity?

Shortly after America's entry into the war, the State Board of Education in California was given power to reduce the school term to six months, with the approval of the governor, when necessary "for the planting or harvesting of crops or for other agricultural or horticultural purposes." In New York the Commissioner of Education was given power to suspend the compulsory education law from April first to November first during the war, "for the purpose of aiding and performing labor in the cultivation, production and care of food products and gardens within the state." The majority of the cities and rural districts heard from in the course of my inquiry exempted children last year from May to October; others, from April 15th to October first; still others, from April 15th to November first. It is quite apparent that many children have suffered tremendously from an interruption of their course of school training as a result of such action. I do not hesitate for a moment to say that action of this kind is of doubtful wisdom, if we consider the welfare of the children and also that of the nation in the long run. No matter how great the amount of the increase of food supply might have been, this was too high a price to pay.

In order to avoid serious interruption of school attendance and at the same time to meet the demands of the farmers when help can not be secured, the following suggestions may be worthy of our careful consideration.

In the city of Watertown, N. Y., the school authorities have planned to postpone the Easter vacation to the first week in May, and to designate it "planting week." Instead of turning the high school boys onto the farms at the expense of school work, they have also planned to organize these boys who are willing to undertake farm work and run the high school from eight to 12:30. In case of calls from the farmers, they can be sent out in the afternoons in automobiles into the territory where their service is needed. It is their contention, in which I concur, that ten, fifteen, or twenty boys under competent direction would do much in the afternoons, and still be able to continue their school work in the mornings.

The Board of Public Education in Philadelphia is developing a plan of organizing into two groups the high school pupils who are going to take up farm work. The first group will leave about the first of May and return for school the first of August. The second group will leave the first of August and return the first of November. This plan will of course necessitate keeping at least one of the high school buildings open during the entire summer. But if the school work of the pupils can be protected from serious interruption by this plan, it is certainly worth trying.

In Madison, Wisconsin, the school authorities have planned to give subjects in the high school in two courses during the second semester. One course follows the usual procedure and the other will be given in a condensed and abbreviated form, to enable those boys who wish to go to the farm to finish the work of the year by April 15th. During this same period some form of practical farm training has also been planned for these same boys. They will be sent on Saturdays to machinery agencies, to gardeners whose tracts are near the city, and to some of the best farmers in order to enable them to get some insight into the activities of the farm. In addition to this, some few consecutive days may also be allowed to groups of boys who may desire to go to the country to make themselves familiar with actual farm operations. This is an excellent plan to meet the abnormal condition, but the writer can by no means agree to the proposition that the children should be excused as early as April 15th. He is quite convinced that there is no great necessity of sending the boys to the farms earlier than the middle of May.

The fourth plan of avoiding the loss of school work will be to make vacations suit farm needs. It may be well to divide the vacation into two periods; one covers the season of planting and the other the season of harvesting. It has been said that California has already been making plans of this nature in order to shift the vacations from the usual time and adjust them to the necessities of agriculture.

No one of the above mentioned plans can serve as a general solution of the problems which are peculiar to different localities. But they are very suggestive as to what may be done in meeting the difficulty. Plans may differ, but the aim should always be the same; that is, to meet the demands of war without a serious interruption of the education which is building youth in the principles of manhood and of efficient citizenship.

Scholarship Requirements

The tendency to make school standing one of the conditions under which exemption would be granted was practically universal. The general form of this requirement was that children were granted the full year's credit, if their scholarship was passable at the time when they left school. This requirement is very excellent in itself, if it be strictly carried out. Unfortunately this was not done last year. Evidences are not lacking to show that many children in some places who did not have passing grades went to the farms in order to get credit and promotion. I can not resist the temptation to quote an amusing story about a boy in the state of Missouri and his effort to cheat the school and himself in this connection. The story runs as follows: "One boy whose father owned a farm told his father he was to leave school to work on the farm. His father said it was not necessary as he had all the labor he needed. The boy insisted and finally told his father that his only chance for promotion lay in leaving school to do farm work." This story seems too amusing to be true, but undoubtedly many cases like this must have happened elsewhere. Teachers and principals of public schools must be aware of this kind of "camouflage" and see to it that no promotion be granted to any child under any circumstance unless he really deserves it.

Furthermore, provisions should be made for the children who leave school early in the spring to make up their work in the fall before promotion is granted. It would be very unwise to give the children a guarantee of promotion beforehand. Make them work for it. The reason for this suggestion has been clearly and forcibly expressed by the statement made by the superintendent of Waltham, Mass. He says: "We are struggling with the problem this year when we are appealed to to release students for about three months. Sentiment seems to demand it. But unless students will themselves speed up and so make up the work which their classes will do, we do not see how we can restore them to their classes in the fall. While we recognize that the experience may be richly educative, we do not see how it can be substituted for mathematics or science or foreign language so as to enable the student to keep step with his class. Honesty forbids us to assure students or their parents—as some would have us do—that a boy may eat his cake and have it too, even in war time." Quite a few superintendents have expressed this same feeling. Unless some provision is made to assist the pupils in making up the work they lose, I do not see how promotion can be granted to them when they can not keep step with their class work.

Survey of the Demand for Farm Labor

It seems to be a truism that schools should not excuse children from regular school work if they are not needed on the farms. But this simple truism was ignored by many school authorities who excused children from school without knowing where the children were going to work or whether they were needed. In New Jersey one camp of boys was organized last summer under the State's Junior Industrial Army and housed in a high school building. But there was not enough work in the vicinity to keep the boys busy, so they were found mowing lawns and trimming hedges on large estates or pulling weeds out of the city roads. In New Bedford, Massachusetts, 35 high school boys went to the farm, but their camp was soon broken up for the reason that there was not enough work to pay for keeping the camp going. In Watertown, New York, high school boys were permitted to leave school for farm work. The expectation was that they would continue the work throughout the summer. But on the first of July most of the boys returned home and went to work in munition factories on account of not having enough work on the farm. Examples like this can be multiplied indefinitely. The educational loss in these cases is enormous and also inexcusable. I can never over-emphasize the statement that such or similar conditions should never be allowed to happen again.

In preventing such conditions from happening again, I believe what is being done in Indiana is worth noticing. In an endeavor to ascertain the demand for farm labor in the spring the Federal State Director of the U. S. Boys' Working Reserve has sent out a questionnaire with return card to the farmers requesting them to consider their possible need of farm labor and report such need to the headquarters in Indianapolis. The following is the return card in full:

> "Name .... Postoffice Address ....
> County .... Township ....
> Nearest Railroad Station ....Name of Railroad............
> Telephone .... Nearest town ....
>
> Without definitely obligating myself, but rather to give you some indication as to what I anticipate in the way of labor requirements next spring and summer, I hereby notify the U. S. Department of Labor, through the State Council of Defense for Indiana, that I probably can use ....boy or boys, 16 to 21 years of age, whom I shall need ....(date). I am willing to pay ....dollars per week with board. I am willing to pay ....dollars per week without board.
>
> In consideration of the service they are going to render me, I shall gladly co-operate with them in their efforts to succeed and will be patient and considerate of them. I realize that their presence on my farm will be indicative of the patriotism they possess and therefor deserving of an equal amount of patriotic effort on my part to build of them fine, up-standing citizens, equipped for the man's job which of necessity they now must shoulder."

Something of a similar nature was also done by some cities last year. The school authorities in Louisville, Kentucky, stood ready to take action last spring to excuse high school pupils for farm work. But before taking this action, they made a survey of the demand for such labor among the farmers and truck gardeners of the surrounding country. Of some three hundred addressed but one was positive that he could use such help. A second gardener implied that he might consider doing so in the name of patriotism. In Milwaukee, Wisconsin, the machinery of Farm Placement Work was set in operation, although no survey of the labor demand had been made beforehand. The entire Farm Placement work was placed in the hands of one attendance officer, with the assistance of the Rotary Club of the city. The result was that all children excused had places on the farm.

All these measures are worth imitating. We must be sure that there is need of child labor on the farm before we exempt the children. Failing to do this will greatly harm the cause of public education.

Training Children for Farm Work

In spite of the popular clamor for children on farms, quite a few superintendents have stated that farmers did not want to employ city boys as many people thought they would. This general testimony corroborates the findings of the investigation made by the National Child Labor Committee last year. In an attempt to find out the demand for child labor on the farm, the National Child Labor Committee sent out a questionnaire to all grange officers throughout the country asking if farmers in their vicinity wanted city children to work on their farms. Of all the replies, 72 per cent said 'no.' Some of the reasons given for this negative answer were as follows:[1]

"City boys are not worth their keep on a farm."

"The work is too heavy for children."

"City boys do not understand how to drive a horse or handle machinery."

"Horses are too valuable to trust to children."

"There is nothing for children to do in this vicinity as we do our work by machinery."

"It would take two farmers to one boy."

"Tending small corn is a delicate business for a city-bred child, while haying and harvesting are too heavy work for one not accustomed to labor in the hot sun."

"How would manufacturers like to have green hands come into their shops for a few days? The same question can be applied to the farmer in trying to work school children who would simply be under foot."

From these sample statements one can clearly see that farmers do not want city boys who are not familiar with the farming operations or too young to undertake the heavy task that farm work often involves. But city boys over 16 years of age with good health and alert minds can learn the rudimentary farming operations in a week or ten days, if proper training be given to them. The work accomplished by the Agricultural Cadets last summer in the orchards and fields of Betsy River Orchard Company, Michigan, may serve as an excellent illustration of this point. When the superintendent of the company was asked to give his opinion about the work done by the boys, he made the following statements:[2]

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[1] National Child Labor Committee. Pamphlet-277.

"The first week or so the boys were not much good. None of them had ever been on a farm before, and they didn't know a horse from a cow. But they were quick and eager to learn, and from the start they took a keen interest in learning how to work. . . .

"When we sent them out to spray an orchard, Bob Johnson, my Michigan Aggie man, would go along and teach them how to do it. He worked along with them until he was absolutely sure that they could be trusted to do the work right before he left them any work on their own responsibility, and even then he would go back every hour or so to see how they were getting along. We soon had them doing the more simple work, like hoeing potatoes and beans, but even there you would be surprised how much teaching we had to do—showing them the difference between beans and weeds, for instance.

"Later, we had them doing more particular work like spraying, and of course, had to begin at the bottom to teach every time we changed jobs. It was noticeable, however, that we rarely had to show them a second time. The boys learned very easily and quickly and really tried to do their best."

The ways of training boys for farm work are many, but only two can be mentioned here. In the first place, an intensive farm training camp may prove very effective for the purpose. The most noteworthy case of this kind is the training camp which is going to be established in Indiana. On a 640-acre farm loaned by Straus Brothers Company the U. S. Boys' Working Reserve will build a farm training camp where boys between 16 and 21 will be mobilized and given a three weeks' intensive farm training in the rudiments of agriculture and actual farm operations. As a group of boys completes its three weeks' training, it will be sent to different places to work. The whole plan is analogous to the officers' training camps. I have no doubt that such a plan will prove to be very valuable in increasing the efficiency of young farm workers whose ignorance of farming operations has constantly been a great embarrassment to their employers and themselves.

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[2] Boy Power. Jan. 1918. P. 8.

In the second place, the plan of introducing a practical course of agriculture in the curriculum of high schools, as is being done in Illinois, is by far the best one so far devised. Beginning the first of February, the boys in the state of Illinois enrolled in the U S. Boys Working Reserve were made to speed up on their studies for the ensuing three months, and in addition were required to take the 25 Farm Craft Lessons which were prepared under the direction of Dean Davenport of the University of Illinois and which were designed to give them a practical knowledge of horses, livestock, dairying, poultry, seeds, fertilizers, farm tools, gardening, gas engines, crops, planting, and harvesting. Credits will be given for this special work done in school and for the practical work in the summer months.

Beside this class-room instruction, practical work in the use of farm machinery, caring of the stock, harnessing and handling horses, etc., has also been provided, and the boys have been taken on field trips to stockyards, stock shows, farm exhibits and local agricultural fairs.

This plan is unique in its character and practical in its scope. By this plan the schools are made to teach the pupils to play the real game of life of which city-bred boys are often grossly ignorant. What is being done in Illinois can certainly be done elsewhere with equal advantage and success.

Organization, Inspection, and Supervision

The problem of organization, inspection, and supervision of the boys at work is infinitely more complex than any one of the points so far discussed. Every locality has its own peculiar problem to solve. Plans which have been worked out in one place may be utterly inadaptable to any other place. Consequently discussions of this problem can be made only in very general terms.

Taking the country as a whole, there are three main conditions under which the boys may work on the farm. First, one or two boys may be employed by a farmer and live with him. Second, boys or groups of boys may work on a nearby farm and live at their own homes. Third, boys or groups of boys may work on farms, many miles away from their homes, and live at farm camps. In each of these cases some kind of inspection or supervision must be provided by the local Board of Education in co-operation with other state or local agencies.

In the first case, the most important problem is the placement of the child. The environment in which the child is going to live, the kind of work and the hours of labor which the child is expected to perform, and the wages which the farmer is willing to pay must be investigated before the child is definitely placed. The farmer is just as likely to exploit the child as the manufacturer. Unless some definite agreement is made with the farmer beforehand, it will be unwise to leave the child to him for his exploitation. We must remember that to utilize boy-power for food production is to meet the present exigency of national crisis, not to supply the farmer with cheap labor. What was done in Grand Rapids, Michigan, is worth noticing in this connection. Last year about three hundred boys in the upper grades and high schools were carefully placed on the farms by the school authorities. The Board of Education employed a competent man to visit them and adjust their difficulties. This seems to be one of the many ways in which the school can safeguard the children from undesirable environments, over-work, exploitation, and neglect.

In the case of boys or a group of boys working in the nearby farms and living at home, some kind of organization seems to be very necessary in order to secure satisfaction for all concerned. Just what kind of organization is necessary for any particular place is a question for the local school board or other social agencies to decide. But I shall describe the system which was worked out in Idaho, in order to throw some light on the question.

In the southern part of that state there was a great need of labor to harvest the fruit crop and alfalfa last year. Appeal for help was made to the school authorities and many boys were permitted to go to the farms. They were organized into groups of ten. Every group elected its own captain in whom the power of discipline was invested. The captain's words were law during work hours, whether in the orchard or in the hay field. In no case did the farmers deal with the boys directly. Everything was done through the captain. If they had any orders to give, they gave them to the captain, who, in turn, passed them to the boys. Now and then disputes arose over counting the boxes of fruit picked by the boys, but they were all adjusted through the captain. This squad organization has proved to be very satisfactory, both for the farmer and for the boys themselves. Furthermore, organization of this kind has to some extent solved the problem of transporting the boys back and forth between their homes and the places of their work. Through the co-operation of the business men in the towns of that state who volunteered the use of their machines, the boys were taken out of the cities and towns to work at 7 o'clock in the morning and taken back to their homes at night. One can easily imagine how such squad organization has helped in solving this transportation problem.

With regard to the organization of farm camps, there are three things which merit our attention. In the first place, a camp should not be established in a place where there is not enough work to keep it up through the summer. This seems to be a commonplace truth, yet many undesirable results have happened merely on account of ignoring it. In the second place, camp sanitation must be strictly observed in order to safeguard the health of the boys. In the third place, one camp supervisor for every 25 boys should be appointed and paid by the state. He should be a man of character and initiative, a man who possesses an insight into the nature of adolescent boys. A successful scout master will be just the person for such a task. These are only general principles. For detailed organization the service of the camp experts should always be sought.

Educational Value of Farm Work

After this brief discussion of exempting school children for farm work we may say that there are difficulties yet to be obviated and problems yet to be solved. But we should not let these difficulties and problems blind us to the fact that farm work for city boys of adolescent age possesses an educational value which can not be surpassed by any subject in the high school curriculum. In farm work city boys gain a knowledge of real things and of real life which they can never expect to gain in reading a few pages of Latin grammar or in working out a few puzzles in geometry. Far be it from me to minimize the educational value of farm work for boys of proper age, under proper organization, training, and supervision. It would mark a great step of advance in modern pedagogy, if city boys between 16 and 21 were given an opportunity to be employed on the farm during the long summer vacation, in order to get in contact with nature, to appreciate the realities of life, to gain first hand knowledge of animals, plants, trees, and fields in an unsophisticated manner, to recognize the dignity of labor by actual participation, to increase their physical vigor by working in the open air and sunlight, and to shift their usual interest in gangs and in loafing at the street corners and gutters to productive activities which are both beneficial to the community and to themselves. But the writer strongly objects to any action of letting children out of school with the expressed purpose of supplying the farmer with labor without any consideration of their physical capability or incapability of undertaking heavy farm work, without any knowledge of where they are going or how they are to be employed, without making any provision for them to make up the school work they lose in order to enable them to keep pace with their classes, and without any definite plans of organization, inspection, and supervision of the boys at work, to safeguard their physical and moral well-being. The children of to-day will be the citizens of to-morrow. If the function of the school is to train children for good citizenship, then it is the duty of the school masters to see to it that the children's interests—interests which are most vital for their physical, moral, intellectual, and spiritual growth—are carefully protected.

In addition to the protective measures to be adopted in connection with exempting children for farm work, there is one more suggestion I wish to make, that is, a course in practical farming should be made a required subject of study in every high school throughout the country. It is absurd to preach the dignity of labor to children and yet not consider the elements of labor worth the dignity of being taught in the school. If farm work is expected to be taken up by boys of proper age, in order to increase the food production of the nation, then a practical farm course should certainly have a place in the school curriculum. What has been called Farmcraft Lessons introduced in Illinois high schools (referred to on p. 186. should be adopted by all the high schools in every state of the Union. Subjects like the feeding, care, driving, and working of the horse, the care and milking of the cow, the care of cattle, pig, and sheep, the process of raising poultry, the handling and the care of wagon and plow, the use of manure and artificial fertilizer, the use and care of shovel, spade, hoe, rake, pitchfork, and other tools, the recognition of weeds and their destruction, the harvest of hay and grain crops, the operating and care of farm machinery, the ways of building fences and gates, etc., should be taught to every boy who passes through the door of the high school. Knowledge of this kind is both practical and useful and possesses a fascinating nature to the boys, urban and rural, rich and poor, alike. Pedagogues who have been in the habit of reducing everything introduced into the school to scholastic hypermethodic form can not and will not appreciate the educational value in planting potatoes, in picking fruits, or in operating a harvesting machine in the grain field. But their conservative view must be changed. The value of school subjects is being tested by this world war. The simple, plain, and sun-clear reasons given by farmers for their unwillingness to employ city boys on their farms should give the pedagogues some food for thought. High schools have always been a stronghold of conservatism. We have been teaching the general principles of drawing, mathematics, physics, chemistry, etc.; but the physics and chemistry of nothing in particular. We have been teaching botany, zoology, and other natural sciences, but they are to be studied by sections through a microscope. The knowledge thus gained by the boys is most fragmentary in nature. They lose sight of the unity in the subject itself and its relation to civilization and social weal. Can we wonder why city-bred boys can be of very little service on the farm and farmers do not want them? If the war has compelled us to utilize boy-power on the farm as a national necessity, can we advance any argument that practical farming operations should not be taught in the schools?

Conclusion

In conclusion, I may say that gardening is not a movement started by the war, but war has made us appreciate its value. Under proper organization and direction, it helps to increase the agricultural output of the nation and serves to vitalize the school curriculum. What we are doing to-day under the necessity of war must be continued in time of peace.

Farm work for boys of proper age is a real education in itself. It should be encouraged, organized, directed, and supervised by the school authorities, war or no war. But to exempt children from school attendance for farm work is a war measure and can only be justified by the real needs of war. It can only be done under the most carefully regulated conditions. Let me repeat the slogans now prevailing in England: " The child is the nation's greatest treasure," and, " We have no right to handicap these children because of the State's necessities of the moment."

THE PUBLIC SCHOOLS AND FOOD CONSERVATION

By Ping Ling

Next to food production, to which the last chapter has been devoted, food conservation has been one of the greatest and most important problems confronting the American people since America entered the war. Its immensity and complexity are in many respects much greater than the problem of food production, because it requires the voluntary effort, cooperation and self-denial of every man, woman and child in the country. We can persuade a well-to-do person to buy Liberty Bonds and to buy a good many of them, because they are a good and safe investment. We can also ask him to contribute and to contribute very liberally to the funds of the Y. M. C. A., Red Cross, and other charity organizations connected with the war, because contributions of this kind always reflect the generosity and philanthropic spirit of the giver. But can we still count on him as a patriot when his appetite is touched? We can teach a child to plant potatoes and vegetables in his father's back yard, because work of that kind appeals to his working impulse, and we can also appeal to the grown-up boys to work on the farm because there is a good deal of fun in the work and good wages beside. But can we still count on them as a part of the patriotic force when they are asked to conquer their candy-eating habit and to reduce the unnecessary consumption of certain foods which they used to have? The spirit of sacrifice can only follow the intelligent appreciation of the situation. If in a democracy the autocratic control of food supply, imposed from the top, and backed by the "mystery of law" and the sword of the police, is to be avoided, then the American people must appreciate the seriousness of the national and international food crisis and respond loyally and voluntarily to the appeal of the government in whatever measure the Food Administration deems necessary. Our faith in democracy is being tested. Failure in the voluntary system of food conservation will be a greater blow to democracy than the loss of a great battle.

In studying the progress of the food conservation campaign, Mr. Edward Earle Purinton has made a most noteworthy statement as follows:

"The food pledge-card campaign recently conducted in

American households by the Food Administration has brought to light an astonishing and appalling state of things. I have before me a typical war food report on the household canvass, from which I will quote.

"This community stands among the first twenty of its size in America for intellectuality and prosperity. It has a famous university, a group of flourishing factories, dozens of women's clubs, the most and first-rated banks of any city of equal size in the state. You would expect people here to be of a high patriotic order, of superior conscience and intelligence. Read the facts.

"The pledge cards required nothing difficult, only asked that each family does its best in avoiding waste, and conserving meat and wheat during the war. Out of 2500 families in this highly favored community, the heads of only 800 families responded to the government appeal, the other 1,700 positively refused, or conveniently forgot, to sign and return the cards. Only 32 per cent of the families of this representative American city are patriotic as far down as their palate.

"When the official agents of the government called with pledge cards at the homes of these 1,700 householders, they met with answers like this:

'Our food is our own and we don't want anybody to meddle.'

'We work hard. Why shouldn't we eat what we want?'

'I tried to send a chicken to my son in France and the government wouldn't take it. I will never do anything for the government again.'

'My husband doesn't like corn bread.'

"The human beings who made the assortment of remarks quoted above are not the poor, illiterate foreigners you would naturally consider them. No, they are the choice inhabitants of a place that proudly calls itself the intellectual Athens of the state.

"Among those who refused to consider meatless, wheatless or sugarless meals, the largest number stated positively they saw no reason for such a war measure, and they would not subscribe to it unless they were shown the necessity for it."

Reports like this may be a trivial incident of the whole food campaign, yet it is very significant, because it shows very clearly and definitely that the food campaign must be accompanied by a campaign of education, if the compulsory rationing system should be employed only as the last resort. Average people can not visualize the close relationship between food and war. They must be informed with regard to the essential facts of the world food situation and made to realize that food conservation is a patriotic duty. They must also be taught with regard to the essential facts of food values, so that the general principle of the elimination of waste, the substitution of certain foods for others and the lessening of unnecessary consumption be properly understood and practiced. A campaign of education will always remain the most important factor in a voluntary system of food control. We have no other means to choose.

In this campaign of education the schools in this country, as a branch of governmental activities, have a very great and very immediate task to perform. They must teach the children who are in their trust the problems of food supply in this country and in the allied World, the relative values of different foods, and the ways of eliminating waste, in order to make them understand the larger implications of the food problem, to cultivate thrifty habits, and to arouse in them a higher sense of patriotism, loyalty, self-sacrifice, and collective responsibility. They must also extend their influence to the homes and the community they serve in direct and indirect ways with regard to this great undertaking of national food conservation. Through organization and direction of parent-teacher associations, through establishment of lecture and instruction courses for adults, and through other similar means, they can serve the country as a center of publicity and dissemination of vital and practical knowledge and of demonstration of practical methods of meeting present demands for better provision and utilization of food products and other necessaries. It is their opportunity to demonstrate their usefulness to the nation and their ability to meet national needs at this crisis. Here is the opportunity, but how to make use of it?

In an investigation of the effect of war upon education the writer included in the questionnaire sent out to school superintendents the following question:

"What have your schools done for food conservation, such as signing pledge cards, teaching economy, cooking, etc.?"

The answers to this question are much less definite and clear than was expected; only a few of them have indicated what has been done and how much has been accomplished. My impression is that public schools in general, particularly those in the rural districts, have not fully grasped this unique opportunity in serving their country along this particular line. It is the purpose of this chapter to show what the schools and school teachers can do in this great national movement.

Teaching the Children to Conserve

In teaching the meaning, necessity, and practice of food conservation, public school teachers can utilize practically every subject in the school curriculum. With possibly the exception of Latin, Greek, and other foreign languages, there is no subject which can not be taught with great advantage in connection with some phase of food economy. Let us first consider:

Geography.—Geography lends itself very readily in teaching children the problems of food supply of the world in general and of the allied countries in particular. In teaching the climatic conditions of the world, it may be well to point out that the principal food producing countries as well as the consuming countries, are in the temperate zones. Except coffee, cacao, sugar, and fruits, the tropics are not at present producing important foods in great quantities for the hungry world. In the north temperate zone the three great food producing regions are eastern Asia, central and western Europe, and North America. In the first of these regions the amount of food produced can only support its own enormous population. In the second of these regions the population is too great and supplies have to be drawn mainly from the third region to make up the deficiency. The south temperate zone can also produce foods for the densely populated places in the south like Argentine and Australia, but either of them is too far from the markets and the bulky grains and meats require a tonnage that the world in this time of war can scarcely spare to bring them to the shores of Europe. Furthermore, the capricious rainfall and the occasional drought in Argentine and Australia often produce disastrous result upon the crops, so they are not a very reliable granary for the European importing countries. Facts of this kind can be readily made adaptable to the class-room discussion and interesting and motivating to the children.

Next to the sources of world food a geography teacher may also teach the specific problems of wheat, sugar, meat, and other animal foods of the Allied Countries, with special emphasis upon America's part in solving them as her proper share of war labor. With regard to wheat, the teacher can first give the children some general idea about the normal production and need of European countries in times of peace. Russia, Roumania, and Bulgaria were all wheat exporting countries. Austria-Hungary was a self-sufficing country as far as wheat is concerned. Of all other European countries, France, Italy, Germany, Spain, and Great Britain were all large producers, but their production could not meet their needs. They took 60 per cent of the total world's surplus of wheat for their consumption. Holland, Belgium, Switzerland and the Scandinavian countries largely depended upon the importation of wheat for their very existence. The importation of wheat into Europe, aside from what came from Russia and Roumania, was principally supplied by the United States, Canada, Argentine, India, and Australia. It was estimated that these seven countries furnished 94 per cent of the world exportation of wheat.

This was the condition in times of peace. What is the state of world wheat in time of war? The teacher can then with the map of the world point out to the children the reason why Russia could not send her wheat to the Western Allies by the closing of Bosphorus, and why the exportations from India, Australia, and Argentine can not be easily brought to the European market, because of the shortage of shipping through the destruction by submarines. As a logical sequence of the discussion, the teacher can further explain the reason why the United States is obliged to supply the deficiency of wheat to the three great Western Allies, England, France, and Italy, in order to maintain their gallant troops in the fields, to feed their great armies of men and women in the munition factories, and to keep their women and children at home from actual starvation. With this general treatment of the facts, the teacher can bring very forcibly and clearly to the minds of the children the reason why they should do their bit to conserve wheat in order to win the war.

With regard to the sugar supply, the geography teacher can also enlighten her pupils in a similar manner. The problems of the total sugar production in the world, the countries that had led in sugar production, and the causes of sugar shortage in Europe since the war began, can all be brought into discussion in the classroom. In the year preceding the war, 1913, the world sugar supply was given at 20 million tons in round numbers. Of these 20 million tons of sugar, 11 million tons were cane sugar and the rest were beet sugar. A large percentage of the cane sugar of the world has been produced in Cuba, India, Java, and Hawaii; and a very large percentage of beet sugar was produced in central Europe before the war. The pre-war production of sugar in Germany, Russia, and Austria-Hungary constituted 67.4 per cent of the total beet sugar and 32.4 per cent of the total sugar supply of the world. They were enormous exporters. But since the outbreak of the war this normal condition of European sugar supply has been radically changed. The English blockade has cut off the export market for Germany and Austria-Hungary, so sugar beet production in these countries gave place to other crops. The sugar producing regions in Belgium and northern France have been under Germany's control, so they were deprived of their usual sugar supply. As a consequence of these changed conditions, the Western Allies, particularly Great Britain, have to obtain their needed sugar importation from the tropics. But the establishment of new sugar plantations and the installation of new machinery for sugar manufacturing in the tropics can not be achieved in a short time, so the increase of sugar cane production can not meet the deficiency created by the upset of the sugar industry in Europe. America can not supply the Allies with sugar, because she herself has been the greatest sugar importer of the world. But she can greatly reduce her consumption so that the Allies can obtain the minimum amount of sugar for their people. To my mind, facts like this are infinitely more valuable to the children and will be better remembered by them than the names of rivers, mountains, or cities of some remote regions which they can neither visualize nor comprehend.

Similarly the problems of beef, pork, mutton, milk, cheese and other animal foods can also be treated by the geography teacher.

What has been said is merely suggestive as to how the problems of food supply may be taught in connection with geography. No attempt has been made to show the selection of material, or the detailed method of instruction. It is my belief that a resourceful teacher will always find that instruction of this kind will prove practical, useful, interesting and inspiring to the children.

Current Events. This is a new kind of instruction given in a great many schools since the entrance of America into the war. The purpose of this course is to keep the children informed about the outstanding events of the world from time to time. Considering the nature of this course I believe the teacher can and ought to draw a good deal of material of food conservation for her instruction. The policy of the Food Administration in this country and the drastic measures adopted by the Allies in food control should receive special attention in a class of this kind.

Take the problem of wheat. The Italian government has decreed that wheat must be milled at 90 per cent (which means that only 10 per cent of the whole wheat kernel does not go into the flour). The flour thus obtained from 90 per cent milling goes to make the war bread. In England wheat is milled at 81 per cent and to the flour thus obtained flour made of other cereals is now added, in amount of from 30 to 50 per cent. In France wheat is now milled at 85 per cent. Flour made from other cereals must be mixed with this wheat flour to the amount of 30 per cent.

Furthermore, the baker's trade in the Allied Countries has been rigidly controlled. In Italy bread may not be put on sale or given for food until the day after it is baked, and it may not be treated by special processes to keep it fresh. No sweet pastries may be made whatsoever. In England the use of flour has been restricted to four pounds per person per week. In France, bread is distributed on a bread card system, which permits each child of from one to six years to have 10½ ounces of bread per day; and each person over six years, 1 1/10 pounds of bread a day. No pastry or fancy cakes may be made.

Simple facts of this kind are very important for the public to know. Americans who have been asked to conserve wheat, meat, sugar, and other foodstuffs for the sake of the Allies have a right to know what the Allies are doing themselves in the way of food economy. It is the duty of teachers who teach current events to tell children these facts and through the children to enlighten the public.

English. The teacher of English can use much of the material of food economy as a basis for oral and written work in her class. Subjects like "Why must we conserve wheat? Sugar? Meat? etc." are very excellent for English composition work, both for the grades and for the high school. Supply the pupils with the necessary facts and make them use these facts as a basis of judgment of their own. Composition work of this kind will set the pupils to thinking intelligently in terms of community welfare and national necessity. Debates or essay contests between classes and schools can also be very conveniently arranged on such subjects, as was done in some school systems last year. A modern English teacher with sound pedagogical training will not fail to see the advantage of using such material to vitalize instruction. It gives the children food for thought and enables them to express such thought in definite, clear, and unmistakable terms.

As an illustration of my contention I reproduce two compositions; one was written by an eighth grade pupil in one of the elementary schools in Worcester, Mass., and the other was written by a German child in a German common school. They are as follows:

"THE CONSERVATION OF FOOD"

(By F. R., 14 years of age. Worcester, Mass.)

"To win the war food must be conserved. The United States has 1,500,000 men under arms at present to be trained for war. These men as well as those of our Allies must have substantial food to withstand the rigors of trench life.

"Wheat, sugar, fats and meats are good solid food for the Army and Navy, and in order to have enough for all, the people at home must conserve these products. By conserving everywhere and by having war gardens there will be enough for the soldiers in the trenches, the sailors on the sea, and the people at home.

“So, make a special effort to save food for our soldiers, for our Allies, and for freedom and victory.”

“Must We Go Hungry?”

(By a German child, 14 years of age. Germany, 1915.)*

“Since England can not match us in strength, she has cut us off from all food importation in order to starve us out. Each one of us may now ask himself: Are we to let ourselves die of hunger? With good conscience we can answer: ‘If we are economical with all the foods we have and do not continue to live in the habitual manner, we shall come out all right.’ With wheat. flour and vegetables we must be sparing. The State regulated the distribution of wheat flour because we had been eating too much. The Roumanians, to our great joy, have sent us trains of wheat flour. On account of the shortage of potatoes the State issued an order forbidding the distilling of alcohol and the feeding of swine with potato. As we hear, the tilling of the fields in the East and West is going on from 8 kilometers behind the front. From Belgium we obtain early vegetables, and from Russia, quantities of grain. We Germans eat more meat than the other people in Europe, namely 58 kilograms per person. We must limit our use of meat and enjoy vegetable diet. To eat moderately and to chew thoroughly are the principal conditions. If we observe this, the starvation policy of England will also go to naught.”

*Stern. Jugendliches Seelenleben und Krieg. p. 177.

Arithmetic. In order to show how arithmetic can be used as a means of teaching the different phases of food conservation, Farmer and Huntington have recently published an excellent book, entitled “Food Problems,” which was intended for the reference of the elementary school teachers in arithmetic. The whole book consists of 173 problems, and each one of them was introduced with the definite aim and purpose of teaching children the real meaning and importance of saving food. The following are some of the problems stated.

1. “Mr. Hoover asks each of the 100 million people in the United States to save 1 ounce of meat each day, 1 ounce of sugar each day, 2 ounces of fats each week, and 1 pound of wheat flour each week. If we all do this,

a. How many tons of meat
b. How many tons of sugar
c. How many tons of fats
d. How many 196-pound barrels of flour will be saved for the nation each week? How many a year?

2. “The United States Department of Agriculture states that 700 million dollars has been wasted in homes in this country every year by throwing away food which might be used. There are 20 million families in the United States. What is the average waste for each family per year? Per month? Per day?

3. “In 1916 the following amounts were spent in the United States:

For patent medicine	300	millions	of	dollars,
For tobacco	600	“	“	“
For jewelry	200	“	“	“
For wines and liquors	1669	“	“	“

a. If all these amounts were saved, how much would be the total saving?

b. At the rate of one billion dollars per month for the war, for how long would the total saving finance the war?

4. "The average use of wheat flour in this country is about 4.9 pounds per person each week.

a. If on wheatless days no wheat flour is eaten, and normal amounts are used on other days, what will be the average saving in flour by each person each week?

b. For a city of 30 thousand people?

c. For the whole nation of 100 million people?

d. About how many 196-pound barrels will be saved by the nation weekly?

5. "Assume that 1 ounce of meat is wasted each day in each of the 20 million homes in the United States.

a. How many pounds? How many pounds per year (360 days)?

b. If the average dressed weight of cattle is about 525 pounds, how many cattle would it take to supply this annual waste?

6. "If each of our 20 million families wastes one-fourth ounce of butter daily, find how many pounds are wasted each day. How many tons each year?

7. "Mrs. White wastes a cup of sour milk each week by throwing it away. Milk costs 12 cents a quart in the city where she lives.

a. How much money is wasted yearly in the White home by throwing away milk?

b. Compute the waste if this happened in each home in your city, your state, or the nation.

c. What would be the total value of the milk wasted in the United States at 10 cents a quart? At 8 cents a quart? At 6 cents a quart?

8. "Each person in the United States consumes on the average 90 pounds of sugar each year. He needs only 4/5 pound a week.

a. How much is consumed each year that is not needed? How much could be saved if the average use of sugar by each of the 100 million persons in this country were reduced to what is needed?

b. Our Allies need 2700 million tons of sugar. What per cent of this could be secured through the above saving?"

From these few sample problems one must be greatly impressed with the ingenuity with which these problems were framed; and one must also agree with the authors' statement that "the purpose of these problems is not to teach arithmetic; it is to use arithmetic to teach the meaning, necessity, and practice of food conservation." Through the working out of these problems the children will find out for themselves that no waste is too small if it happens in every family, and that no saving is too trivial if it is made by every one. Children in the elementary schools are in the most impressionable period of their lives. Problems of this kind never fail to stir their emotions, stimulate their imagination, and arouse their spirit of self-denial and sacrifice. The writer strongly recommends that this book be in the hands of every teacher who has charge of teaching arithmetic in elementary schools.

Physiology and Hygiene. The teacher of physiology and hygiene has undoubtedly a great opportunity to use materials which are close to the children's activities and interests. Instead of burdening their memory with the technical names of bones and muscles, she can teach the quantity and quality of food desirable and the relative values of different foods which are common in the market. Of all the health habits which modern pedagogues must endeavor to inculcate in the children, the habit of correct eating is the most essential. Of all the elements of health which modern pedagogy has emphasized in the hygiene of school children, the relation of food to growth has received the least attention. I believe now is the high time for the teachers of elementary physiology to rejuvenate their traditional methods of instruction. The different food values reduced to the simplest language will be both more beneficial and comprehensible to the children than any material which we commonly find in elementary text-books of physiology.

One of the chief objections in teaching food values to children is the hopeless incomprehensibility of the technical language used in the copious literature on the subject. The only way of measuring and determining the amount of food we need is by the caloric method. But the word "calory" is utterly unintelligible to children. Not only children, but also lay people, as a rule, have very little conception of what is meant by a calory. Not only lay people, but also many physicians have a very hazy idea of what is meant when they say that an individual should have 2,200 or 3,000 calories a day. We commit a great pedagogical error, if we ask children to remember by heart that so many grams of a certain amount of food equal so many calories, and so many grams of another kind of food have an equal amount of caloric value. Children of elementary schools can not visualize the amount of food measured in grams, nor can they translate the caloric value of food into intelligible terms to themselves. But what are we going to teach and how are we going to meet this difficulty?

Dr. William Emerson of Boston has reduced the common unit of 100 calories (which was first introduced by Dr. Irving Fisher) into most familiar terms such as teaspoonfuls, cupfuls, and so on, so that common people or even children can understand. For instance, two table-spoonfuls of lima beans equals 100 calories; one ripe banana equals 100 calories; one roll equals 100 calories; one pat of butter equals 100 calories; four of the ordinary Uneeda biscuits equal 100 calories, a lean portion of one lamb chop equals 100 calories; twelve double peanuts equal 100 calories, a piece of fish about the size of the palm of the hand equals 100 calories; a teaspoonful of peanut butter equals 100 calories; and so you can go through the whole list of common foods which are found in the ordinary family table.[1] Beautiful charts have been made on this basis. It has been said that by this method Dr. Emerson has been able to teach dietetics to delicate children of even seven or eight years of age with regard to the amount of calories they have taken a day and the amount they still need to make up their quota. It seems to me that a great advance has been made in dietary instruction by translating the number of calories into familiar measurements. It is both practical and useful for teachers of physiology and hygiene to make use of such material, not only on the ground of the national necessity of the moment but also on the principle of sound pedagogical methods. They can not expect to be excused or forgiven for neglecting the instruction of this kind.

Furthermore, instruction on food values is of paramount importance for the protection of the children's health. Many children from wealthy homes are being overfed and still more children have a harmful habit of excessive indulgence in eating candy. In one school, which was investigated, it was found that the boys were each receiving about 5,500 calories daily and in addition were getting about 500 more outside in the form of candy. There is no doubt that they were tremendously overfed. The evil result of over-feeding is just as bad as, if not worse than, that of underfeeding. We have been trying hard to have free school lunches for the destitute children. Have we done anything to enlighten the overfed children so that their vital organs may not be overburdened by the unnecessary amount of food?

Excessive indulgence in candy eating is responsible for loss of appetite and decay of the teeth. From the reports of medical inspectors of public schools in different parts of this country we find that approximately 50 per cent of the school children have bad teeth. This lamentable state of affairs may not be due to the candy eating habit of the children concerned, but we can not deny that the candy eating habit is one of the factors responsible. In recent years educators in this country have been clamoring for free dental clinics for school children, but why should we emphasize a pound of cure and neglect an ounce of prevention? American children, poor and rich alike, are in the habit of spending their pennies on candy which they do not need. They buy caramels, chocolate, and hard candy from the pushcart men or the small candy store near the school house. In many cases the school authorities are in a hopeless position to prevent the children from doing so. Attempts have been made by some teachers to teach the children not to eat too much candy, but their efforts have been pitiably ineffective. Now there is a great opportunity for teachers to correct such harmful habits of children in the most effective manner by an appeal to sugar conservation. Make sugar conservation a patriotic service. Pedagogical enlightenment coupled with patriotic motives will not fail to accomplish desirable results.

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[1] Landis, H. R. M. Dietary Habits and Their Improvement. Annals of Am. Acad. of Science, vol. 74, pp. 103-108.

Home Economics. The ways of teaching food conservation in the classes of home economics are many, but only three important ones can be mentioned here.

The simplest and easiest way of teaching food economy is to set aside the regular course of making fancy cakes and dainties and substituting a series of lessons on war recipes which are now available. In doing this the manner adopted by the public schools of Jersey City, New Jersey, is highly commendable. Shortly after the declaration of war, the director of the home economics department decided that domestic science teachers should abandon their traditional method of instruction and teach methods of preparing corn meals, dishes of dried fish, dried vegetables and fruits, meat substitutes, etc., and that home application of each lesson taught in the school must be stressed. As a means of carrying out this idea, the following suggestions were made. First, domestic science teachers should allow more discussions in the class so as to fix more firmly in the minds of the pupils the ideas and principles involved in the lesson and to give them perspective upon the problem. Secondly, the boys are asked to attend some of these classes, and, if they have no sisters in these classes, to take the main idea of the lesson home to their mothers. Thirdly, the teachers should discuss generally the national and international situation with reference to the kind of food taught in the lesson; for example, in the case of corn bread, the difficulty of Europeans in eating corn. Fourthly, the teachers are specially requested to make an effort to have the girls report on the home application of the lesson and to impress upon their minds the double value of the lesson to the pupils themselves and their country. All these suggestions may sound very commonplace, yet these are the very things we are likely to forget or ignore.

The second thing which home economics teachers can do in teaching food conservation is to teach their pupils the arts of canning and drying when the perishable food products are abundant in certain seasons of the year. Through the effort of the Department of Agriculture, thousands of canning clubs were organized in the 15 southern states and hundreds of tons of fruits and vegetables were either canned or dried by the club members. This ought to be done in every state of the country. Teachers of home economics, with their technical knowledge and their close contact with the patrons of the public schools, are in a unique position to revive and to give a new meaning to the industries of canning and preserving which have been fast disappearing from modern American homes. Undoubtedly many school systems have attempted the instruction of canning and preserving in their domestic science classes. The most noteworthy cases are the public schools of Newark, New Jersey, and of Los Angeles, California, where many thousands of dollars worth of perishable food products were preserved by the school girls last year. But judging from all the information at my disposal, the public schools in general have not done any more than give a few demonstrations in the classroom. I am quite convinced that this kind of practical work can and ought to be greatly enlarged and extended.

The third way in which home economics teachers can aid in food conservation is to use the school lunch as a project in teaching war cookery. The idea of using the school lunch thus was first worked out in Kansas City about three years ago. It may not be out of place to mention a few of the salient points of the system. The plan as worked out for the elementary school is as follows:

1. Each child has one year of regular cookery before she takes lunch room cookery.

2. Each class is divided so that a lunch room class will be composed of but eight to twelve pupils.

3. Each lunch room has a helper, paid from the lunch room receipts, who does all heavy lifting, washing of lunch room dishes, mashing of potatoes or other routine duties after the pupils have mastered them sufficiently so that they have no further educative value.

4. Menus are varied sufficiently and yet are inclusive enough, so that, as far as possible, cooking may be done in family quantities.

5. A home economics teacher who has charge of a lunch room is required to teach five less classes a week than the

other home economics teachers, because such a teacher is under a heavy strain during the noon hour, a rest period for other teachers.

From these few points of the system we can easily concede that the educational value of lunch room cookery lies in the increased opportunities for the girls to develop their technique, responsibility, initiative, independence, and ability to cooperate in a social project. What has been proved to be very effective in teaching cookery under ordinary circumstances can be made more effective in teaching food economy in war time. Here the ways of eliminating waste, of preparing war-time cookery, and of using substitutes can be practiced by the pupils on a large scale with added interest and enthusiasm. Whatever accomplishments the children make in the lunch room will fill them with pride and a sense of social service.

Helping the Community to Conserve

In the above pages I have tried to show the possibilities of teaching the children to conserve food in connection with their regular school work. But schools of to-day must not confine themselves to teaching the children only; they must extend their influence to the homes of the children and to the life of the community in this great national movement of food conservation.

Canning work in the community. One of the greatest services that a domestic science teacher can render beyond the four walls of the school, whether she labors in rural or in urban fields, is to organize, direct, and instruct canning work in the community. She can supervise the work of the local canning club. She can teach the housekeepers to rejuvenate their grandmother's method of canning and drying. She can organize special classes during the summer for the mothers and housewives who care to learn this important art. There are a thousand and one ways of rendering her services valuable to the community, if she only has the vision and the interest to do so. The work done by the Rural Home Economics Department of Iowa State Teachers' College, by the Essex County Agricultural School, Massachusetts, and by the public schools in Bernards Township of New Jersey, is most suggestive in this respect.

In Blackhawk County, where the Iowa Teachers' College is situated, the Rural Home Economics Department started a demonstration week in canning last year. In this work three instructors and eight girls from the senior class in domestic science class participated. The school kitchen equipment and laboratories were placed at the disposal of those who were connected with the demonstration work. As a result of the week's work, thirty-nine demonstrations in the canning of fruits and vegetables, etc., by the cold pack method were given. An aggregate number of 1720 persons was in attendance. Twenty-six canning clubs, principally of the "mother-daughter" type and comprising a total membership of 482 persons, were formed, each with its local leader.

In Essex county, Mass., the Agricultural School held a canning school during the first week of September, 1916, to give instruction to housekeepers and local leaders of canning clubs of that county. For this purpose, a temporary wooden building was erected adjacent to the Home Economics building. This was screened and equipped with seven tables, each accommodating eight people; two ranges, two oil stoves, one out-door canner stove. The members of the Agricultural School staff, together with outside speakers invited by the school, took charge of the program of instruction. Despite the disagreeable weather of the week there was an average attendance of 79 members each day for the five days. The practical work done by the members of the school was the canning of fruits and vegetables, the making of jelly, fruit butters, marmalades, and conserves.

In Bernards Township, New Jersey, an experiment in community canning was very successful. In each school in that county an experienced teacher volunteered to supervise the work of preserving performed by high school girls of the neighborhood. The fruits and vegetables were sold by the townspeople to the school or brought by them to be conserved by cooperative canning for their own use in the future. The whole work has proved to be beneficial to teachers, pupils, and to the community in general.

Food Demonstrations.. Another important service which the public schools can render is to arrange demonstrations of war-time cookery for the parents, either in the school kitchens or through some other means. In England, there have been "open days" in the schools on which parents may be admitted to receive instruction with their children in the economical cooking of the food which, according to the food controller's instructions, is likely to be available for general consumption. This is the most sensible thing for the school to do. If the school is to be the social center of the community, I can see no reason why the parents should not be allowed to study such important functions as home making and food preparing with their daughters in the same classroom.

Similar actions have been taken by some city school systems in this country. The most typical case of this kind is the action taken by the school authorities of Jersey City, New Jersey. In an effort to secure direct contact with the mothers and housewives of the city, the superintendent of schools issued the following letter.

To Mothers of Children in Jersey City Schools:

"The President's recent Proclamation has these words regarding food economy as a great patriotic duty:

'Let me suggest that every housewife who practices strict economy puts herself in the ranks of those who serve the nation. This is the time for America to correct her unpardonable fault of wastefulness and extravagance. Let every man and every woman assume the duty of careful, provident use and expenditure as a public duty, as a dictate of patriotism which no one can now expect ever to be excused or forgiven for ignoring.'

"The world's food supply is short this year. Every pound of wheat that one can avoid using, every ounce of fat that one can use instead of throwing away, is just so much added to the food supply of a world that is going to need it sorely. And no matter whether one 'can afford it' or not.

"The teachers of domestic science in our schools have, of course, given much study to this very subject. At present they are making a very special effort to keep in touch with the newest suggestions from the Federal Bureau of Agriculture, the New York Food Supply Committee and such sources, and to teach their pupils that:

"Many of the inexpensive foods are the most nutritious.

"Preparation of inexpensive foods may be varied in many ways to make them appetizing.

"We would urge, in behalf of the general welfare, that if you have a daughter in any of these classes you will make a serious trial in your own family of the suggestions which we hope she is bringing home to you.

"If none of your children has this work, would you yourself be interested to come to the school on one or more afternoons from 3 to 4:30 P. M. for a study of these same problems? If so, will you please fill out blank attached below and return it as soon as possible to the principal of the school?"

It was reported that as a result of this appeal many special classes have been formed for the parents.

In addition to these devices of drawing parents to the school, the school can also move itself to accommodate the parents. In London county, England, the responsible mistresses of the evening schools and the domestic economy staff employed in these schools have organized traveling kitchens in 29 boroughs within the county. These traveling kitchens possess all the necessary apparatus by which the simplest forms of cookery can be demonstrated to 100 or 200 people. According to the report of Sir Robert Blair of the London County Council, we find that these demonstrations were well attended and many people in small villages have thus been given an opportunity to learn from experts methods of making palatable the food products which were less understood and less used before.

In another county of England, a domestic science lecturer arranged an experimental course of lectures and demonstrations on economical cookery, and equipped with necessary utensils a traveling kitchen at a cost of $100. She covered each of the larger villages in the area selected, spending one day in each place. The morning hours were spent for traveling. In the afternoons exhibitions of wheat flour substitutes were arranged and demonstrations given. She also gave talks on bee-keeping, horticulture, fruit bottling, and so on. In the evening she gave a cooking demonstration.[2]

In Pennsylvania a very ingenious device was made by the Food Supply Committee of that state's Committee of Public Safety, to present to the people, in a striking and attractive form the principal needs and methods of food conservation. Borrowing from the experience of agricultural colleges and state departments of agriculture, the committee secured the cooperation of the Pennsylvania Railroad Company in starting a food demonstration train which was scheduled to reach more particularly the smaller towns and cities. The whole train was devoted to the demonstration of canning and drying, of using wheat substitutes, and of using vegetable fats in place of butter and lard. It was also shown that if every one in Pennsylvania saved one ounce of sugar, one ounce of meat, two ounces of wheat flour, and one-third ounce of fat daily, then in one week enough food would be saved to supply the draft army of the state, 60,859 men, with sugar for seven months, meat for two months, and flour for five months, and a large quantity of ammunition containing glycerine manufactured from the fat. The story was depicted with miniature warehouse, army supply wagon and an encampment representing the war home of the Pennsylvania draft quota. As a result of this effort, fifty thousand people in all have attended the demonstrations in three months.

This "moving school of food conservation," as it was called, was not started by the public school, nor will it be possible for any individual school to undertake such an activity on a large scale. But the schools can give very valuable help to such enterprise. For instance, the preliminary preparation for the arrival of the train and the organization of follow-up work after it leaves are all within the ability of the school.

Schools as Center of Publicity. Another important use of schools and school population in food conservation campaign is the distribution of government pamphlets, information cards and the pledge-card canvass, etc. Typical work along this line may be said to have been done by the public schools in

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[2] Dean. Our Schools in War Time and After. p. 124.

Los Angeles. They have distributed 50,000 copies of a pamphlet prepared by the Home Economics Department, containing very practical receipts written in simple language and suitable of preparation in homes, even the poorest. In addition to this the Department continued a periodic distribution of weekly recipes on mimeographed sheets, the total number of which is now in excess of half a million. The schools also undertook the sale of a more elaborate, yet inexpensive publication, the Liberty Cook Book, compiled by members of the National Council of Defense and published by the City Teachers Club. There were 27,000 copies of this book sold. The net profit of $300 derived from the sale was devoted to the work of the Red Cross. Beside this thousands of food conservation cards have been given to the children to be taken home and returned by them with the signatures of their parents. I believe activities of this kind should be encouraged and made more general throughout the country.

Other Miscellaneous Activities. Beside the organization of community canning work, food demonstrations, and dissemination of information as I have mentioned above, there are several other activities which may be mentioned in passing.

In Germany school children have been enlisted in the work of collecting field and forest edible products since the war began. Children were engaged in the work of gleaning and in the summer of 1915 the gleanings amounted to approximately $50,000. On account of the scarcity of fats, the children were made to gather acorns, horse-chestnuts, and seeds containing oil. In August of 1916 children were employed in the extraction from trees in the state forests of resin which was needed chiefly for the paper industry; and in the same season school children collected enormous quantities of kernels of cherries, plums, and apricots for oil extraction.

In America, the foods in the forest are of enormous variety and of immense quantity. Beside the numerous edible mushrooms, roots, fruits of shrubs, and smaller plants, the trees of the forests afford a large variety of edibles which are highly worthy of gathering and conserving. The kernels of beechnuts, butternuts, walnuts, chestnuts and chinkapins, hazelnuts, and several kinds of hickory nuts, including pecans, are not only toothsome but highly nutritious and are used by vegetarians to replace meat. Acorns are commonly thought to be fit only for feeding hogs, but many kinds can be made edible and nourishing for people as well. The kernels of the buckeye can also be dried, powdered, and by filtration freed of the poison which they contain when raw and made into palatable food. Several varieties of wild crab-apples can be made into delicious jellies. It has been reported that some of the largest, which attain the size of small apples, are more or less abundant throughout eastern North Carolina. These and many other kinds of fruits and nuts are the gifts of nature. If the service of the school children be utilized in collecting and conserving them, the amount of food thus obtained may easily surpass our wildest imagination.

The next school activity which is worthy of noticing is the "Jar Day" instituted in Berkeley, California, last year. In this jar day the school children of the entire city went out and collected every discarded and undesired jar from different homes. These were cleaned and sold and the money was turned into a "Service Fund." Many of these jars were used for canning purpose and filled with surplus vegetables to be used for the poor in the winter. This and many other similar activities can be instituted by every city in this country.

The third creditable activity I wish to mention is the food conservation drive in the Central High School, Omaha, Nebraska. The drive lasted three days and was in charge of a committee consisting of a faculty chairman, a student chairman, and four student members—one representative from each class. On the first day of the drive attention was focused on advertising. For this purpose posters furnished by the art classes and blackboard printing were used. The common slogan featured in the advertising was

"All you need is self-denial
FOOD CONSERVATION
Give it a Trial."

On the second day, girls wearing cooking aprons and Food Administration caps, distributed in the lunch room "Note Book Cards" modeled after the regulation home cards.

On the third day, a pledge-card calling for the observance each week of 21 wasteless meals, 7 wheatless meals, 10 meatless meals, 2 candyless days, and 1 ice-creamless day was given to every pupil. Short speeches were given in each room by some student and the members of the class were asked to sign the pledge cards on the promise that the pledge would be strictly observed.

The result of this campaign was very satisfactory. A great many of the pledge cards were signed, averaging 100 per cent in some rooms.

A campaign like this is one of the many ways of enlisting the cooperation of the pupils in food conservation. But such a drive should always be followed by some follow-up work, so that the patriotic spirit of the pupils shall not end with the signing of the cards or shortly after.

CONCLUSION

In teaching the public with regard to food problems, food values, and practices of food economy, public schools are in a unique position to serve the country. They can teach the children to conserve in conection with regular school subjects and through the children they may indirectly enlighten the public. They can help the community to conserve in a great many ways, and thus fulfill their mission as social centers of the community. These are the proper things for the school to do, war or no war. To-day we teach food conservation as a patriotic necessity, but we must continue to do it as an educational necessity of to-morrow when this great world conflict is over.

THE PREPARATION OF THE TEACHER OF PHYSICAL TRAINING[1]

THOMAS A. STOREY.

We, the people of the State of New York, are to-day in possession of the greatest opportunity for the effective health education of school children that has ever been given a State by its lawmakers. There has never been a time in the history of intelligent thought in the educational world when school people did not realize the importance of health in the educational affairs of the child. But though school people have talked long and though they have talked earnestly, our actual progress in physical training has been slight. We have not put our thought, our scientific knowledge, or our ideals of health education into practical application. The obstacles to such application have been many.

But to-day, thanks to the almost unanimous vote of the legislature of 1916, the Regents of the University of the State of New York are under the welcome obligation to enforce the operation of a physical training program—a program in health education and health habits—in every elementary and secondary school of the State, public and private, and for every child in those schools, girl or boy, eight years of age or older. This, I repeat, is the greatest opportunity for the health education of school children that has ever been given a State by its lawmakers.

But it is one thing to see an opportunity and quite another thing to use it. We all see this opportunity. The legislature saw it. The Commission which the legislature created saw it. The Regents of the University of the State of New York, the State Department of Education, the school superintendents, school principals and school teachers—all see it. How will we use it?

The legislature saw—and made a law. The Commission saw—and recommended a "General Plan" and a detailed and suggestive syllabus. The Regents saw—and adopted that general plan and syllabus and made them their own. The Plan and Syllabus are now the rules and regulations of the Regents of the University of the State of New York. The

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[1] Presented at Cornell University, February 21, 1918.

State Department of Education and the other school people of the State see the opportunity. They are now placing the general plan and syllabus into operation.

It is right here that the difficult difference between seeing this opportunity and using this opportunity impresses itself. These difficulties are many. Not one of them is insurmountable. We may have to wait here and there, but it is possible for every school to make some immediate progress in the use of this opportunity. The final and full realization may be long delayed, but it is worth working for, and it is worth hard work, and it is worth an immediate beginning.

It is hard to change old and established schedules. We are reluctant to make the school day longer. Our older buildings are not equipped for gymnastic drills or recreational play. Many of our schools have no playground. The schedule and supervisory complications are great in the congested school. The teacher in the one-room school, with ten children—six girls and four boys, the youngest six years old and the oldest seventeen, has a difficult problem. These difficulties, however, ought not to be permanently obstructive. They are worth only a temporary delay. Not one of them merits consideration as an argument against the health care of school children. These difficulties are largely due to the fact that we have been concerned more with subjects, more with courses of study, with schedules, with buildings, and with equipments, than with children. This program of health education centers about the child. If its operation requires changes in schedules, or buildings, or equipment, or what not, those changes should be made as soon as it is reasonably possible to do so.

The most important difficulty that we face arises from a general lack of training among the regular teachers and from a lack of a sufficient number of specially trained teachers. In my judgment, this lack of training is one of the most serious problems that confront us. If we are to see results from this plan for the health education of school children; if we are to reduce sickness and death in our schools; if we are to produce a longer lived, as well as a better educated citizen, we must place the operation of this program in the hands of trained teachers whose expert knowledge will be tactfully and sympathetically applied for the production of better health habits from the pupil in the one-room school to the pupil in the metropolitan institution.

The nature of the training which should be secured by our teachers is indicated on the one hand by the program of physical training outlined in the General Plan and elaborated in the syllabus of the Regents. It will be indicated on the other hand by the special local school and community conditions for which the teacher must be prepared if he is to adapt his teaching to the peculiar needs of the district to which he goes.

In general, it may be said that the teacher in training should receive physical training for three major purposes:

First: He should acquire health information and health habits, whereby he may so train his own physical self as to secure the best possible organic service.

Second: He should be instructed concerning the main facts of school hygiene, so that he may wisely affect such school conditions as may be open to his influence when he begins teaching.

Third: He should be taught how to guide and instruct school children, so that they may acquire and use a practical health education and profit fully from all the important character building and socially developing lessons that are so intimately a part of certain phases of physical training.

I should say, then, that every teacher in training should receive, first, regular, wise, and reasonable health examinations and supervision; second, a course in school hygiene; third, a course covering the care of the body and the facts of personal and general hygiene; and fourth, regular physical exercise, made up of those elements of disciplinary drill and recreational exercise that are known to have real health values.

And every teacher in training should receive such practical and expert instruction as will enable him to take an effective teaching part in the routine physical training program that belongs to the regular class room and to the play period, such as class inspections, talks on the care of the body and the facts of hygiene, setting-up drills, and the various play activities.

The special teacher of physical training should in addition be taught in some detail the important reasons for the health examination and health supervision of school children. He should be more intimately acquainted with the sciences that go into personal and general hygiene, such as anatomy, physiology, and bacteriology, and his work in school hygiene should be more heavily emphasized than that of the regular teachers. He should be given practical experience, under expert supervision, in teaching setting-up drills, gymnastics, marching, games, group dancing, and school athletics.

And he should be given special opportunity to understand and appreciate the possibilities of correlating the school with the home and with the community through the medium of recreational activities, athletic sports, and community social affairs. Too much emphasis can hardly be placed upon the importance of developing vision, initiative, and capacity for the establishment and maintenance of the relationship between the school and the home and the community.

There can be no doubt that the success of this program depends upon efficient teaching. We must arrange as rapidly as possible for such training in our normal schools, colleges and other schools in which teachers are prepared for their work. And we must arrange for a reasonably uniform plan for the training of special teachers of physical training. We must make haste slowly. It would be unfortunate if great differences in standards and content should appear in the curriculums of the various training schools of the State.

It is to be hoped that physical training will attract many capable men and women as teachers. Those already actively engaged in teaching may find opportunity in various ways to fit themselves to meet the demands which the physical training syllabus makes on the regular teacher. Perhaps the most useful source of such training will be found in the summer school. The colleges, normal schools, training schools, and other centers in which teachers are trained ought within the reasonable future have developed courses for the education of the regular teacher and the special teacher of physical training. In the course of time every teacher will be prepared for those phases of physical training that fall to the regular classroom teacher, and we will have available a sufficient number of special teachers to meet the demand.

When I view this future, I am filled with enthusiasm. Our fifty-seven thousand teachers and our two million school children offer health educational possibilities that are too big to measure and too large to understand. If the teachers of this State will influence our boys and girls so that health habits will become common in school, home, and community, we shall soon have men and women in our communities and in our homes who recognize not only their health obligations to their kith and kin, but to their neighbors; men and women with social minds; men and women that deserve to command, because they have learned how to obey; and we shall have more added millions of years of potential productive healthy citizenship than I know how to estimate.

If the teacher sows health habits in the minds, muscles, and nerves of school children, the harvest will be gathered from a great increase in every productive activity of manhood and womanhood through all the years of their consequent longer lives.

I hope you may be party to this project; that you may have a share in this service; that you will have something real to do with this plan for the acquisition and conservation of human health, human happiness, and human productivity.

I would rather be a helper in this project; I'd rather have a share in this service; I'd rather have had something real to do with the acquisition and conservation of a healthier, happier, more productive, and a longer-lived world community of men and women than to have been a victor in the greatest commercial or military battle or the biggest political campaign the world has ever known. Today, more than ever before, do we need such men and such women.

AESTHETIC APPRECIATION OF PICTURES BY CHILDREN

By Rudolf Pintner, Ohio State University.

A number of children ranging in age from six to fourteen were asked to arrange six pictures in the order of their preference, beginning with the one they thought most beautiful.[1] The six pictures were six different executions of the same theme, differing only in accuracy of drawing and perspective and in coloring. Number 1 was a colored print of a picture, entitled "The Mill," and the other five were water-color copies of this. Number 2 was a very good copy of the original. Numbers 3 and 4 were slightly inferior to number 2, differing from each other in color tone rather than anything else. Number 4 was more subdued than number 3. The artist herself ranked number 3 as superior to number 4. Number 5 was distinctly inferior to the preceding in drawing, and was characterized by rather brilliant colors, a bright pink and a bright yellow being very conspicuous. Number 6 was drawn very badly and the coloring was very crude. The colors were not, however, as bright as those of number 5.

The children were very interested in the experiment and experienced no difficulty in coming to a decision. A group of 83 university students were also asked to arrange the pictures. Among these adults some hesitation in making a decision was occasionally shown.

At all ages a great diversity of preference was manifest. The distributions of the rankings for each picture for each age are too lengthy to give here. It may be sufficient to note that most of the pictures were given every possible ranking at almost all ages. This is equally true of the adults. Picture number 6, the worst picture, was given first place by at least one child at every age, with the exception of ages 10 and 12. Two adults also ranked this picture first. An exception to this wide scattering of ranks, at least in the upper ages, might be seen with picture number 1, the best picture. At ages 6, 10, 11, 12, 13, and 14 this picture was not ranked last by any individual. It was, however, given last place by one adult.

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[1] The writer is indebted to his wife for securing the data for this article and to his sister, Miss Dora Pintner, for painting the necessary pictures.

The average of the ranks accorded each picture at each age is shown in Table I. The table is to be read as follows: the average of the ranks assigned by 15 six-year-olds to picture number 1 was 3.0, to picture number 2 it was 4.1, and so on. At age seven the average rank for 23 children for picture number 1 was 2.3, and so on for the other ages. It will be noted that there is not very much difference between the average ranks for the six pictures at age six, indicating little agreement among the children as to their preferences. As we proceed to the higher ages, the difference between the average ranks becomes gradually more marked, indicating a more general agreement among the individuals as to the preferred order of rank. Aesthetic judgment would seem to become more uniform as the child grows older. He is gradually learning to conform to the aesthetic standards of his environment. It would seem from this experiment that this conformity begins surprisingly early in life and would seem to be effected at a comparatively early age.

TABLE I. AVERAGE RANK OF PICTURES

		PICTURE NO.					
Age.	N.	1	2	3	4	5	6
6	15	3.0	4.1	3.7	3.6	2.7	3.9
7	23	2.3	4.1	4.2	4.0	2.5	3.8
8	27	2.6	3.1	4.1	3.9	3.0	4.1
9	18	2.0	3.9	4.1	3.3	3.2	4.3
10	18	1.3	3.1	4.0	3.3	4.8	4.7
11	27	2.1	3.6	3.4	3.8	3.9	4.6
12	26	1.2	3.2	3.7	3.7	4.7	4.9
13	13	1.5	3.1	3.5	3.4	4.5	5.0
14	11	1.6	3.1	3.5	3.3	5.2	4.4
Adult	83	1.4	2.6	3.7	3.5	4.4	5.2

This may be seen from Table II, which shows the first,

TABLE II. PICTURES ARRANGED ACCORDING TO ORDER OF CHOICE AT EACH AGE

	CHOICE					
Age.	1st.	2nd.	3rd.	4th.	5th.	6th.
6	5	1	4	3	6	2
7	1	5	6	4	2	3
8	1	5	2	4	3	6
9	1	5	4	2	3	6
10	1	2	4	3	6	5
11	1	3	2	4	5	6
12	1	2	4	3	5	6
13	1	2	4	3	5	6
14	1	2	4	3	6	5
Adult	1	2	4	3	5	6

second, third, fourth, fifth and sixth choices for each age, as determined by the average rank of each picture. The picture, which on the average ranked highest for the six-year-olds, was number 5. This was followed by numbers 1, 4, 3, 6 and 2 in the order named. A glance at the table shows us that picture number 1 was given first choice at every age, except age six, where it took second place. This would seem to show that children, even as young as seven, on the whole have learned to recognize as most beautiful what is so designated by the adult taste. This tendency is also operative, though not dominant, at age six, where we note that picture number 1 takes second place. Picture number 5 was characterized by bright pink and yellow, and is ranked first by the six-year-olds, presumably because of the coloring. It is interesting to note how picture number 5 struggles to retain a high place, and succeeds in securing second place at ages 7, 8, and 9, but ultimately falls to fifth or sixth place at all succeeding ages. There are among the seven, eight and nine-year-olds quite a number of children who still rank as most beautiful the picture with the bright colors. After age nine there are very few children who rank number 5 highly. Conformity to conventional standards in this regard evidently develops rapidly from age nine onwards.

It is interesting to note how picture number 2 rises from last place at age six to second place at age ten, and from age twelve onwards retains the second place continually. Picture number 6 is given fifth or sixth place at all ages, with the exception of age seven, where it actually is placed third.

As we have already stated, there was very little difference between pictures 3 and 4, the artist inclining to rank 3 superior to 4. At ages twelve, thirteen, fourteen and adult 4 is placed higher than 3. If 3 is superior to 4 according to the canons of fine art, then we may conclude that our older children and adults have not yet reached the highest possible development in their aesthetic taste.

In conclusion, we may say that as far as this experiment goes, it would seem to indicate a very early conformity of young children to the conventional standards of aesthetic judgment of pictures. There are indications that this conformity is developed gradually and that for pictures of the type with which this experiment deals, it is fairly well developed in the majority of children at age seven and about completely developed in the majority of children at age ten.

CLARK LIBRARY WAR COLLECTION

By Louis N. Wilson, Librarian, Clark University.

When the great war broke out, in August, 1914, President Hall suggested that the Library should make an effort to collect as much printed material as possible upon the subject. This was done at once, and later it was decided to add pictorial material as well as posters and proclamations.

The collection at present consists of

Books and pamphlets	5,500
Posters and proclamations	2,400
Pictures and maps	2,820
	10,720

The books and pamphlets have been classified in accordance with a war classification drawn up by Miss Helen J. Elliot of the Library staff, who has for the past two years devoted all her time to this collection.

Each pamphlet is bound separately and treated as a book. Miss Mabel O. Boice has devoted a good deal of her time to making cards for the posters and pictures; these we expect to classify during the summer according to a system now under consideration.

These war posters have been shown at various times in Worcester, notably at the Art Museum in April, 1917, and again, on a larger scale, at the rooms of the American Fund for French Wounded on October 11-12, when $170 was realized for that most worthy war work. Selected small collections have been lent for exhibition at the Boston Athenaeum; Waltham Public Library; Leicester Public Library and the Southbridge Women's Club. The Librarian has given talks at various times on war posters, illustrated by selected specimens.

The collection of books and pamphlets has been used quite extensively by professors and students. We have lent nearly 300 volumes at different times to the officers at Camp Devens and have also lent books to others engaged in war work, as the Bureau of Standards, Washington, D. C.; American Optical Co., Southbridge, Mass.; Curtis Airplane Co., Garden City, L. I.; U. S. Signal Corps, Washington, D. C., and we have sent a copy of Professor A. G. Webster's book on Dynamics to the U. S. Signal Corps in France.

Some of the subjects for which we have laid out special books for study are:

Argot; Balkan States and the War; Burial of the Dead (mourning); Camouflage; Censorship; Economic Aspects and Results of the War; Education After the War; Education as Affected by the War; Food Supply; German Colonies in the Pacific; German School Literature on the War (militaristic tendency of school text-books); German Theologians and the War; Insignia and Flags; Medals; Nationality; Patriotism; Pro-German Propaganda in War Literature; Psychology of the Soldier; Psychology of War; Re-education of Disabled Soldiers; Russia and the War; Russian Revolution; Shell Shock; War Stamps; Trench Papers; War Libraries and Museums; War Songs and Music.

At a meeting of the American Library Institute at Atlantic City, in February, the librarian advocated the establishment of a National War Library and Museum in Washington. The suggestion received the hearty endorsement of the Institute and the matter has recently been laid before President Wilson.

In order to help in some practical way the Library issued a War Savings Stamp slip to be inserted in the books as taken out from the Library. The design was evidently a success as the National War Savings Committee has ordered 200,000 of the slips for general distribution.

BOOK NOTES

Education, selective, specific, compensatory. By MICHAEL WEST. With a foreword by Hon. Mr. W. W. HORNELL. New York, Longmans, Green & Co., 1917. 223 p.

The writer interprets selective education as better based not upon the individual choice of the pupils but upon the judgment of his instructors. He believes the former method has wrought chaos and insists that the latter is a more effective way of getting a boy fitted to his career. As to the second type of education, viz., the specific, the essential point is that it must be compulsory because one must forego one's larger hopes. Nobody wants to be trained to be what he is, but if he is educated he thinks it must make him what he is not. The young are hopeful, parents are optimists, so they do not want to improve their sphere but to rise out of it. But national efficiency means every man must be perfect in his sphere. In industrial countries there must be specialization and that involves concession of individual liberties. As to the third or compensatory type, there is no education save the influence of man on man. This theory may help but does not solve the social problem in itself. As to political ideas, we must educate for the future and the things at our feet must be out of focus. We must educate for development and drop retrospection. We must train for a selective empire. The writer finds his ideas pretty well embodied in the system of Bengal.

The school as a social institution; an introduction to the study of social education. By CHARLES L. ROBBINS. Boston, Allyn and Bacon (c. 1918). 470 p.

The movement to which this book is devoted means a great expansion of the sphere of education and of the school, and here we have an attempt to describe in a practical way, suitable for teachers, this new expansive movement. It traces the tendency through the modern history of education, and then attempts to describe the social ideals of the school, such as temperance, freedom, responsibility, initiative, cooperation, justice. The third chapter deals with social conditions which control, such as the relations to the church, philanthropy, societies, business, civil government, tradition and custom, public opinion, special classes. Then we come to the reaction of the school upon society, its effects in advancing learning, in specialization, industry, etc., the school as a protective, selective, guiding, moralizing agency, as a community center, as a social problem, and then we have the course of study and method.

The cadet manual; official handbook for high school volunteers of the United States. By MAJOR E. Z. STEEVER III and MAJOR J. L. FRINK. Philadelphia, J. B. Lippincott Co. (c. 1918). 317 p.

The preface of this book tells us that universal training is the one safe foundation upon which the national defense of democracy may be reared. This training, although universal, must be without any hint of militarism, for it takes the people as a whole and not as a class. The obligation of defense is simply the acme of civic obligation and its military features are well calculated to impress the juvenile mind. It gives a more virile manhood as well as provides trained defenders. We are by no means a fit nation. Training gives great access of citizenship. It increases a sense of responsibility and teamwork and the spirit of it is that of the game or team. The work is timely and interesting.

The influence of age and experience on correlations concerned with mental tests. By EDWARD SAFFORD JONES. Baltimore, Warwick and York, 1917. 89 p.

The author finds a marked fidelity to intellectual types of individuals through the adolescent period of growth. The amount of school work completed also correlates well with average mental ability. In general speed of learning is a highly reliable measurement for testing specific capacity in any particular line, though workers who are rapid at one time may be more or less so years later. Immediate memory is correlated with the amount of school work completed. This study verifies the view that a well-rounded training of an individual is likely to place his general intellectual rank for years to come. Tested capacities may vary greatly in stability. Schools must eventually adopt mental tests for all.

The psychology of special disability in spelling. By LETA S. HOLLINGWORTH, assisted by C. AMELIA WINFORD. New York, Teachers College, 1918. 105 p.

The authors conclude that spelling disability does not necessarily imply defective intelligence. Ability to spell is not a unit trait but is an ensemble of traits less simple than had been thought before. The large number of independent factors suggests greater variability among individuals, which we find in fact. Extreme cases differ very much from each other in degree because these factors differ. Some of the poorest spellers may have original capacity and there are a few whose disability is so great they cannot learn to spell.

Experimental tests of mathematical ability and their prognostic value. By AGNES LOW ROGERS. New York, Teachers College, 1918. 118 p.

The writer claims that her sextet of tests provides a quick means of diagnosing the mathematical intelligence of pupils in the third year of the junior high school, with a view to improving the classification of students in the high school by eliminating from the mathematical classes those unfit for further training in this line, and selecting those capable of more rapid progress.

The mythology of all races. Edited by LOUIS HERBERT GRAY. Volume XII, *Egyptian.* By W. MAX MÜLLER. *Indo-Chinese.* By SIR JAMES GEORGE SCOTT. Boston, Marshall Jones Co., 1918. 450 p.

Here we have the twelfth volume of this very comprehensive work which is devoted to Egypt, India and China. The standard of the other volumes seems to be well maintained, the illustrations are copious, a number of them are colored, and while the body of the book is readable, the copious notes at the end are designed to meet the needs of the scholar and expert.

School and home gardening. By KARY CADMUS DAVIS. Philadelphia, J. B. Lippincott Co. (c. 1918). 353 p.

This is meant to represent the school garden movement. A few of the chapters will signify sufficiently the scope of the book. First there is the outlook, beginnings and aims, vacant lots, etc.; then the operations and exercises, planning the garden, the tools, soil, light, improvements, training, fertilization, plots, etc.; while part three is devoted to club leaders and teachers. The book is illustrated with some 120 cuts.

The melodic method in school music. By DAVID C. TAYLOR. New York, MacMillan Co., 1918. 171 p.

The thoughtful and especially the psychological educator will have great sympathy with the view that stresses the importance of melody and which also believes that the pupil should hear more music and even the phonograph should have a larger place. Most pupils will hear more music than they will produce and hence this type of musical education should take the place of the hypermethodic note-drill that has hitherto prevailed.

Psychological tests, a bibliography. Supplement to Jan. 1, 1918. By GEORGIE A. RUGER. Bureau of Educational Experiments, 16 West Eighth Street, New York. p. 79-111.

This is a very valuable list of books and articles relating to mental tests. The larger part of the references are devoted to mental tests other than the Binet Simon scale. Brief notes in regard to the contents of the different articles add greatly to the value of the bibliography.

Amalia. By JOSÉ MÁRMOL. Edited by AMES HAVEN CORLEY. New York, MacMillan Co., 1918. 300 p.

This is an attractive edition of a well-known Spanish text.

The Stanford revision and extension of the Binet-Simon scale for measuring intelligence. By LEWIS M. TERMAN and others. Baltimore, Warwick and York, 1917. 179 p.

The picture completion test. By RUDOLF PINTNER and MARGARET M. ANDERSON. Baltimore, Warwick and York, 1917. 101 p.

The outer courts; a waking dream. By M. AGNES FOX. With a foreword by The Right Reverend C. H. BRENT. New York, Longmans, Green and Co., 1917. 87 p.

The use of the kindergarten gifts. By GRACE FULMER. Boston, Houghton Mifflin Co. (c. 1918). 232 p.

The Fox series of readers. By FLORENCE C. FOX.
The Fox primer from Mother Goose; a phonetic reader. 170 p.
First reader. 156 p.
Second reader. 170 p.
Teacher's manual. 62 p.
New York, G. P. Putnam's Sons, 1918.

Memory and the learning process. By DARWIN OLIVER LYON. Baltimore, Warwick and York, 1917. 184 p.

Training pupils to study. By H. B. WILSON. Baltimore, Warwick and York, 1917. 72 p.

Lesson plans in fourth grade history. By M. Annie Grace, Emma C. Monroe, and others. Baltimore, Warwick and York, 1917. 155 p.

Real stories from Baltimore County history; data obtained by the teachers and children of Baltimore Country (Maryland) schools. Revised and adapted by Isobel Davidson. Baltimore, Warwick and York, 1917. 282 p.

Annual report of the Board of Regents of the Smithsonian Institution, showing the operations, expenditures, and condition of the institution for the year ending June 30, 1916. Washington, Government Printing Office, 1917. 607 p.

War service of the American Library Association. Described by Theodore Wesley Koch. Washington, D. C., Library of Congress, 1918. 35 p.

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ASTIGMATISM AND BRAIN WORK

By William H. Burnham, Clark University, Worcester, Mass.

Nature creates no standardized products, but rather makes organs that approximate perfection and then supplies other organs or mechanisms to correct the defects. This is especially illustrated in the cornea of the eye. The outside integument of the eyeball, the sclerotic coat, is curved out in front like a bow; and this anterior process forms the cornea, an especially important part of the refractive mechanism of the eye. The curvature of the cornea determines its refractive power. Any variation in this curvature modifies the refraction; hence it is easy to see that in the inherited processes of growth and with all the accidents of growth errors in curvature, and hence errors in refraction, may often occur. These errors constitute the various forms of so-called astigmatism.

Astigmatism, from the Greek ἅ privative and στγμα a point, signifies, as the word indicates, that condition of refraction in which parallel rays of light entering the eye do not come to a focus at the same point on the retina, but there are several foci. The defect is due to an error in the refracting surface, either of the cornea, or of the lens, or of both, usually of the cornea.

Astigmatism was discovered by Thomas Young, who himself had astigmatic eyes. He noted this defect in his own case, but thought it due to a defect in the lens of his eye. Not until many years later did Donders show that astigmatism usually results from differences of refraction in the different meridians of the cornea, and that for the most part the vertical meridian and those lying near it have a greater curvature and consequently greater refractive power than the horizontal and adjacent meridians.

The discovery of astigmatism was of special significance to hygiene. Its importance is obvious when one reflects that nearly everybody has some degree of astigmatism in one or both eyes, that even a small refractive error of this kind under conditions of fatigue and overwork may cause eyestrain, and that connected with this trouble are liable to be many other more or less serious disorders.

" The astronomer Airy, a professor at Cambridge, was the first who corrected the defect by a cylindrical glass (1827). He had high compound myopic astigmatism of the left eye, which he studied and measured by means of a luminous point. Later, Colonel Goulier likewise studied this defect and prescribed cylindrical glasses to a certain number of patients."

" It was only after the invention of the ophthalmometer by Helmholtz that the measurements of Knapp and Donders drew attention to this prevalent anomaly of the human eye." (14, p. 121.)

The correction of astigmatism by the use of cylindrical lenses seems not to have been made in this country before 1872. The importance of correcting this defect, however, was soon recognized and emphasized by Weir Mitchell; but it is only still more recently that the hygienic importance of making tests for astigmatism in the schools has been recognized. Although Javal, the great French ophthalmologist, had shown the significance of the subject, Cohn, even in the second edition of his " Hygiene of the Eye," published in 1892, said that its investigation and diagnosis had little importance for school hygiene.

There are two kinds of astigmatism, regular and irregular. Regular astigmatism is caused by a curvature of the cornea that varies so that one meridian has a greater refraction than another at right angles to it. The irregular form occurs when the same meridian of the cornea or the lens has an unequal refraction in its different parts, that is, the curvature varies. This may be congenital, or due to ulcers, or the like.

Regular astigmatism, caused when one meridian has greater refraction than another, Donders has shown is in most cases due to differences in refraction of the cornea, and that, in the majority of cases, the vertical meridian, and those lying near the vertical, have greater refraction than the horizontal. This has been well illustrated by comparing the ordinary astigmatic eye to an egg, or more accurately, the cornea to the segment of an egg. If we call the meridians running lengthwise of the egg horizontal meridians, and those running the other way vertical, then the egg usually has a greater curvature on its vertical than on its horizontal meridians. In some cases, however, the horizontal meridians have a greater curvature and hence a greater degree of refraction.

Thus the regular astigmatism is of two kinds: first, the common form, where the refraction is greater in the vertical meridian than in the horizontal, called normal astigmatism; and second, the condition where the refraction is greater in the horizontal than in the vertical meridian, or the so-called perverse or inverse astigmatism. The common form, the so-called normal astigmatism, is that which especially concerns school hygiene.

Regular astigmatism may be corrected by cylindrical lenses; irregular astigmatism cannot be corrected, but may sometimes be ameliorated by stenopaic spectacles. One form of the latter due to disease (ophthalmia neonatorum) could be prevented by proper cleansing of the newborn infant's eyes.

Ignoring exceptions, we may confine ourselves to the usual form of astigmatism, that due to an error of refraction in the cornea of such a kind that the vertical meridians have a greater curvature than the horizontal. The other forms of astigmatism will be found described in the literature.

An especially important investigation of the eyes of school children has been made by Dr. Stocker in Luzern, Switzerland (13). He tested altogether the vision of 2,307 school children, 4,614 eyes. One thousand one hundred and thirty-two of the children were in the boys' schools, 1,175 in the girls' schools. He made his tests with Javal's ophthalmometer. Errors of refraction of less than a quarter of a dioptre were not reckoned. Among 2,307 children only 77 were free from astigmatism in both eyes, that is, only 3.3 per cent of all the children tested had a perfectly symmetrical cornea in both eyes. In case of 185 children one eye was normal. Altogether only 339 eyes were found free from astigmatism.

This does not mean that all these children with astigmatic eyes needed glasses. Most of them could see well, and yet a large percentage were deficient in visual acuity. Of those with astigmatic eyes only 19.5 per cent of the boys had normal acuity of vision and only 21.8 per cent of the girls.

Among Dr. Stocker's conclusions are the following: First, The presence of a normal cornea is determined by no law. Second, only 7.3 per cent of the eyes of school children are free from astigmatism. There are 2.6 per cent more normal corneas among the boys than among the girls. Third, 95.4 per cent of the boys and 97.8 per cent of the girls have an astigmatic cornea on at least one side. Fourth, the average degree of astigmatism among all the children amounts to .91

diopter, the average astigmatism of the boys amounting to .78 d., and that of the girls to 1.5 d. The girls have at all ages a greater degree of astigmatism than the boys. Fifth, the minimum astigmatism of all the school children amounts to .25 d., the maximum astigmatism amounts to 7 d. The maximum astigmatism among the boys amounts to 6 d., among the girls to 7 d. Sixth, perverse astigmatism appears in 1.2 per cent of the eyes of the school children, and is more frequent on the right side, and has a maximum of 2 d.

Many careful investigations have been made for many years by Steiger in Switzerland. At the beginning of each new school year all the pupils of the first class have their eyes tested by the city physician. Any pupil that does not have an acuity of vision equal to 1, or in case of good vision shows some disease or abnormality of the eyes, is referred to Dr. Steiger for special investigation. During the years 1894 to 1903, a total of 25,995 school children between the ages of 6 and 7, and sometimes 7 and 8, were tested. Among these 7,736 were referred to Dr. Steiger for special examination. Of these 5,195 were definitely abnormal and about half of these, namely, 2,406, were astigmatic.

Steiger has studied further the frequency of the different degrees of astigmatism of the cornea among children 9 and 10 years of age in Bern, and children 6 and 7 years of age in Zürich. The largest number of cases in the children 9 to 10 years of age in Bern was for one half a diopter, namely, 25.8%; and three fourths of a diopter, 29.3%. In Zürich the largest number was from 1.5 to 2 diopters, 31.8%; and from 2.25 to 3 diopters, 19.4%.

Specially important are Steiger's studies of the relation of astigmatism to acuity of vision. Astigmatism is, according to him, more frequently the cause of weakness of vision than all other causes; and the relation between astigmatism and acuity of vision is sometimes very striking; for example, in the case of children from 6 to 8 years of age with an acuity of vision of 0.3 to 0.6. Three fourths of the cases of defect here are probably due to astigmatism.

Of the number and seriousness of the cases of astigmatism as shown by his own investigations, Steiger said in substance: The fact that of 12,000 eyes of six, seven and eight-year-old children, 1,570 had more or less defective vision, and that in more than half of all cases astigmatism was responsible, will be to many a new and astonishing fact. He found that among the children of the first primary classes alone in Zürich, in three years, 662 eyes with a considerable or high degree of astigmatism, and over 300 eyes with a high degree of astigmatism.

Steiger found the cause of subnormal vision was astigmatism in case of 61.6 per cent of the boys and in case of 61.8 per cent of the girls. These numbers are high and perhaps would not hold in most other countries, but we have relatively few careful studies such as those made by Steiger.

A long list of diseases and disorders due to astigmatism has been described by many writers.

Martin long ago found that astigmatism was one of the chief causes of nervous headache, that many inflammations of the cornea formerly thought to be of scrofulous origin are due to astigmatism, especially when this is greater than 1½ diopter. The disposition to this is produced by the continuous contraction of the ciliary muscle in making correction for the astigmatism. This causes a disorder in the circulation; and he often found that by making corrections with glasses inflammations of the cornea of the character of eczema were better cured than by medicine. In like manner inflammations of the eyelids and of the conjunctiva are cured by fitting the astigmatic eye with correct glasses.

Since Martin the evil effects of astigmatism in producing headache, nervous disorders, and the like, have become familiar to every oculist.

If practically everybody has at least one eye more or less astigmatic, the question may naturally be asked whether everybody ought to wear cylindrical glasses. The answer is that in many cases correction for the error of refraction is unnecessary.

The astigmatic eye is sometimes compared to an unsymmetrical objective lens in a photographic camera. This must be replaced by a symmetrical objective before the apparatus can be satisfactorily used.

In case of the human eye, however, it is sometimes possible to neutralize the astigmatism. This correction is often made by accommodation of the lens, and again the patient sometimes turns his head to the side in order to see through the correct meridian; and sometimes shuts the lids together in order to receive only the rays of light from the better meridian. If correction can be made in this way, then the eye is likely to be reckoned among the normal eyes. If correction for the error of refraction cannot be made, then the eye is classed among those called weak.

Nature uses more or less of a hit-or-miss method in regard to structure and then provides the power of correcting for defects and errors within certain limits.

As Stocker says: "We see here again how nature seldom applies pure mathematics in her work, but likes to leave it to the organism to neutralize the defects of the organ by the self-regulating activity of physical function. In cases of slight astigmatism, and in cases of considerable hyperopia, the visual organs can compensate for the error of refraction and bring about normal vision. And in other cases they can sufficiently compensate for the errors to give good vision if not normal acuity." (13.)

The practical question is what degree of variation should be considered within the limits of the normal; and here again it all depends upon the individual; and the question of what degree of variation from the normal should be corrected by the use of glasses is, especially in case of astigmatism, an individual question. Sometimes a relatively slight degree of astigmatism causes headache and perhaps other unpleasant symptoms.

The presence and degree of astigmatism in a student's eyes is a specially important condition affecting the ability to do mental work. Not only as perhaps the most important receptor organ, but as an important part of the brain itself, the hygiene of the eye is specially important to the brain worker; and an optimum condition of refraction a most important condition of efficient brain activity. This has been emphasized by the results of recent investigations.

Dr. Gould (4) has attempted to diagnose the troubles of a group of literary men and men of science; and it is his belief that Carlyle, Darwin, De Quincey, Huxley, George Eliot, Wagner, Herbert Spencer, Nietzsche, and a number of others, owed their headaches, depression, and nervousness to eyestrain, and that all had astigmatic eyes. In spite of exaggerations, he has collected important evidence of the importance of normal refraction for the brain worker.

Dr. Gould gives a very interesting account of De Quincey as a case of nervous disorder due primarily to eyestrain; but the one thing to be noted in this, as in most of the cases cited by Dr. Gould, is that he makes the whole matter too simple. The man with a horror of narcotics finds that all of De Quincey's troubles were due to the use of opium; he would be an unimaginative psychoanalyst who could not explain them by morbid mental complexes; and, if a dentist were to study his biography, perhaps he would find that his indigestion and nervousness and the rest were primarily due to his bad teeth, just as Dr. Gould finds the cause of every trouble in the reflex ocular neurosis. There may be little doubt that the last mentioned defect was one of the causes; but it may fairly be questioned whether the use of opium, the bad teeth, and perhaps several other factors may not have contributed.

Darwin is one of the men studied especially by Dr. Gould.

The great naturalist, it is said, was unable to work more than three hours a day, and reading was especially trying to him. Dr. Gould has collected many significant passages from his autobiography that indicate that he suffered from astigmatism. Among these are the following: (4)

" German was a great labor to him; in reading it he could read very little at a time. He called it the *Verdammte*."

"Anything attempted beyond the regular routine was attended with pain and difficulty."

"At 36 he had not a day, or rather a night, for three years without great stomach disorder, most days with great prostration of strength. He became so alarmed that he believed he should die, and made 'a solemn and last request.' Trembling of the hands and 'swimming' of the head were added to the other symptoms in 1838, whilst severe headaches were alluded to at the age of 51. If it was possible for a worse than usual to exist from the age of 30 to that of about 57, it was when he was putting the 'Origin' through the press at the age of 50. At the completion of that hurried work, he was in a deplorable condition. . . . Reading at 20 and 21, we remember, made him have 'spirits for nothing,' 'disgusted him so he had not the heart to write anybody,' made him 'miserable before and after,' etc. Such allusions constantly recur, e. g., at 30 he 'read a little, was much unwell;' at 36, 'slaving (writing) extra hard brought great discomfiture of wretched digestive organs;' at 37 'abominable press work' prevented him from writing, being unwell; at 45, his 'stomach deadens his former pure enthusiasm for science and knowledge;' at 49 his stomach 'got into a horrid state from overwork;' at 50, 'health failed, cannot look over any proofs;' he is 'wearied out,' 'worn out,' 'weak as a child,' etc., with proof-reading. At the completion of the 'Origin' he was in an awful state of stomach, strength, temper, and spirits; 'my confounded book half killed me.'"

"The loss of accommodation ended the life-long struggle of the ciliary muscle to overcome the compound hyperopic astigmatism of his eyes, the existence of which will alone explain the mystery of Darwin's ill health. His symptoms, vomiting, and other functional digestional disorders, insomnia, vertigo, headache, apathy, and neurasthenia, are precisely those which the best American oculists find are the most common symptoms of this refractive anomaly of the eyes. Every fact concerning his health, and, indeed, almost every day's experience during his life demonstrated that use of his eyes at near range produced these symptoms."

One of the most remarkable cases studied by Dr. Gould is that of the German musician Wagner. Dr. Gould has quoted at great length from Wagner’s writings and given good evidence that this great musician was a sufferer from astigmatism.

Of a dozen distinguished men, the first group studied by Dr. Gould, De Quincey, Carlyle, Darwin, Huxley, Browning, Spencer, Mrs. Carlyle, Whittier, Margaret Fuller Ossoli, Nietzsche, George Eliot Lewes, and Parkman, Dr. Gould says: “Some of them had some of the symptoms all of the time, some had all of them some of the time, Wagner had all of them all of the time.”

The noteworthy thing was that each one of these twelve found the only relief consisted in stopping reading and writing and in outdoor exercise. In the case of Wagner the symptoms were exaggerated, and the relief that came to him when he stopped using his eyes was marked. At the age of 35 he felt “too old” for undertaking great works; he suffered from great depression, especially in the winter, when of course naturally there was more confinement in the house and probably more reading and writing. Gould has summed up his symptoms very tersely in the following passage:

“Hundreds of such expressions as the following could be gathered: ‘If my head were but better;’ ‘I shall go mad;’ ‘the sharp knife cutting into the nerves of my brain;’ ‘feverishly tired in all my limbs;’ ‘even this letter almost knocks me down;’ ‘I *mustn’t* write, because I can’t;’ ‘my head is nigh bursting;’ ‘every letter knocks me terribly up;’ ‘the nerves of my brain are so racked that I have had to give up all writing and reading for a while;’ ‘I even work a *little* hour a day now;’ ‘a short hour a day now off and on;’ ‘I shall shortly go crazy;’ ‘letter-writing, I am now convinced once for all, severely taxes me, and you therefore may flatter yourself if I manage to fill even this sheet of paper;’ ‘completed my work very much exhausted;’ ‘from noon till bedtime I never write another line;’ ‘writing a longish letter prevents all other work that day;’ ‘I must stop, my head’s getting bad;’ ‘even these few lines put me in a state of violent excitement;’ ‘I ought to give up all reading and writing;’ ‘even the shortest letter wearies me terribly;’ ‘my work has been a perfect torture to me;’ ‘this eternal communication by letter and print is terrible to me;’ ‘my terrible melancholy;’ ‘my nights are mostly sleepless;” as soon as I bend my head toward theory the nerves of my brain begin to ache violently and I feel quite ill;’ ‘truly writing is misery, and men of our sort should not write at all;’ ‘the *Rheingold* is done, but I also am done for;’ ‘this having to make a clean copy kills me;’ ‘I begin to perspire and can write no more;’ ‘the proofs are lying on my table for seven weeks;' 'farewell, I must stretch myself full length on the divan and close my eyes.'"

As clearly shown in one or two of the portraits of Wagner his left eye is turned outward and upward. This, according to Dr. Gould, is a result especially of astigmatism and anisometropia.

Wagner's chief symptom was sick headache, nervous headache, or the like; and of this Dr. Gould says: "I have had thousands of patients with this disease and 99 out of every 100 were cured by spectacles."

Wagner was drugged, given the hydropathic treatment, and so on; but all his physicians seem to have failed to recognize the real cause of his trouble. Even if they had recognized it, no oculist at that time could have corrected the trouble. Additional evidence that Dr. Gould is right is furnished by the fact that at the time when presbyopia was established Wagner found relief, and the sick headaches, melancholia, nervousness and insomnia, and the like, ended, not because of the aid of the King of Bavaria, but because he did not thereafter suffer from eyestrain.

It is unnecessary to multiply examples. Why should such serious results follow from the overstrain of the little ciliary muscle? We can hardly suppose that it is due to toxic products formed by the continuous contraction of the muscle; it must obviously be something more than this. The ordinary idea that the simple ordinary reflexes due to eyestrain cause the unpleasant effects is probably in large part true; but it is doubtful if this by any means represents the whole truth. The study of the conditioned reflexes suggests another factor which may be significant. While we must be on our guard against sweeping inferences, it does not seem improbable that some of the serious disorders in case of the noted brain workers studied by Dr. Gould were due, in part at least, to conditioned reflexes caused by the presence of uncorrected astigmatism.

To recall the main fact, the sensation from any receptor organ may become a conditioned stimulus for a conditioned reflex. We do not have positive proof as yet that conditioned reflexes are formed for the adrenal and other glands with internal secretion in the same way that they are formed for the salivary glands, but we have reason to believe that this is true. Assuming this, let us see what would naturally happen in case of a person who does near work, and especially literary work, when handicapped by an uncorrected error of refraction.

In the case of men who become distinguished in literature or science, usually their work is done with enthusiasm and not infrequently with considerable emotional stress. All such emotional states, as we know, act as direct stimuli to the adrenal glands, and we know not what other glands with internal secretion.

Now in the cases in question, whenever the individual is engaged in this intense work and is excited, and has the emotional stress, at the same time there is the eyestrain. Inevitably the sensation of discomfort from the eyestrain becomes associated with the emotional state. In other words it becomes a conditioned stimulus, and is able to bring about the secretion of the glands as a conditioned reflex. We see at once the serious effects that will occur as soon as this conditioned reflex is established, because the secretion of the glands will occur whenever this eyestrain is felt.

If this theory be true, then we have this cycle of events. First the excitement and enthusiasm and emotional stress of work, eyestrain caused by the errors of refraction, the discomfort of the eyestrain becoming associated with the emotional stress and excitement as a conditioned stimulus, the continuance it may be of the secretion of adrenalin after the direct stimulus, the excitement of the work, is over, and chronic indigestion with its accompaniments of so-called biliousness, dizziness, mental depression and the like, resulting from the increased flow of adrenalin brought about as a conditioned reflex to the eyestrain.

Ordinarily when one stops one's intellectual work the excitement and emotional stress associated with the work soon ceases. But if a person has continuous eyestrain, and this sensation of discomfort from the eyes has become a conditioned stimulus, then when one gives up the work, when the stimulus of the excitement is over, instead of resting, and instead of the glands dropping back into their normal condition, they continue to function because the conditioned stimulus, the eyestrain, persists.

While these may not be the facts, something of this kind is suggested by modern studies. If these are the facts, then we should naturally expect to find that a man with eyestrain and the serious results that follow, indigestion and the rest, would be all right as soon as he leaves his work and goes away into the country, or the like. This is precisely what is found to be true in many cases. Dr. Gould has given a number of examples from the group of distinguished men studied by him.

As regards Huxley, Gould makes out a pretty good case. He was usually knocked out after a few days in London, but all right when he went to the country and began taking exercise.

"In 1857-1858 his health was greatly tried. Headache! headache! is his repeated note. There are many entries such as the following: 'Used up,' 'hypochondriacal and bedevilled 'not good for much,' 'toothache, incapable all day,' 'voiceless,' 'missed lecture,' 'unable to go out.'

"Lassitude and depression seized him, and Clark ordered him to quit all work. He resigns his government positions. By May he was 'in a disgusting state of blue devils,' although there was really nothing the matter, and a month later he was worse—'blue devils and funk, funk and blue devils. Liver I expect.'"

He was so improved by a single day in the country that he said, "I can hardly believe that I felt so ill and miserable 24 hours ago." Medical treatment did him no good, but walking in the open air and giving up study, reading and writing, gave him relief.

"At about the age of twenty-one, excessive ocular labor brought on 'a sort of ophthalmia' which prevented him from reading at night for months. During the four years of the cruise of the *Rattlesnake* there was no complaint of ill health, as in Darwin's case, also there was no eye-strain or not enough to cause it. On his return to work on shore at the age of twenty-six he was soon thin and ill, and at the age of twenty-seven he could not read before breakfast without resultant headaches for the rest of the day, so that, after an illness, he 'reformed' his habits and went to bed at midnight, and arose at 8. Nothing now checks the reign of the mysterious dyspepsia, liver affection—stomach.

"It is certain," says Dr. Gould, "that our patient had far-sighted astigmatism at least of one or two diopters (compound hyperopic astigmatism), probably with a difference in the refractive error of the two eyes (anisometropia); perhaps he had also some lack of balance of the external ocular muscles (heterophoria) and almost certainly he had good or normal acuteness of vision of the two eyes." The noteworthy thing is the distress that came from near work and the relief from giving up reading and the like.

Another result also might naturally be expected. If by the use of proper lenses the eyestrain is removed, or when in the case of a person with hyperopic astigmatism or the like one reaches the age of 60 or 65, when the ocular strain ceases, then the evil effects of the conditioned reflex ought to disappear also. This again we find to be the case. Correction of the errors of refraction remove these disagreeable symptoms, and many of the persons studied by Dr. Gould have in their later years been largely free from the physical disorders they suffered earlier in life.

Of Darwin, Dr. Gould writes: "During the last ten years of his life, the condition of his health was a cause of satisfaction and hope to his family. His condition showed signs of amendment in several particulars. He suffered less distress and discomfort, and was able to work more steadily." And of Huxley he says: "At the age of about forty-nine he got some respite and for about ten years there was far less complaint. But from the age of 59 to 64 his old troubles and some new ones brought him much grief. With the establishment of complete presbyopia at 63 or 64 there was no further complaint."

In children conditioned reflexes in connection with the eye are probably formed in many cases, and the child with an astigmatic eye is probably frequently an illustration of this. A single concrete case may be cited by way of example.

The following is a typical case of astigmatism reported by Dr. Brave (3):

"Jan. 1. Girl, aged 10 years, rather delicate and pale looking. . . .

"Present condition: Child is always nauseated, is dizzy, has headaches and vomits every morning, often twice daily. The child of ten gets dizzy, changes color, turns white; sits down, the eyes roll upward, and the hands show convulsive movements. . . . There is no gastric pain, epigastric distress, or sensation of fulness in the epigastrium. . . ."

Experiments showed she was astigmatic in both eyes.

"Full correction was given and the child was kept out of school for two weeks. March 20th the child was reported perfectly comfortable, with no attacks of vomiting, vision with glasses was normal, and headaches occurred only occasionally."

In such cases it seems natural to suppose that both ordinary and conditioned reflexes are involved. The removal of the abnormal stimuli by suitable lenses effects a cure.

Conclusions

The important things to be remembered in regard to astigmatism are the following:

(1) Astigmatism is caused chiefly if not entirely by inherited peculiarities of the cornea or the lens, usually of the cornea.

(2) Everybody almost has some degree of astigmatism; more than 90% of all eyes, probably more than 95%, are to some degree astigmatic.

(3) Astigmatism is the chief cause of defect of vision in probably more than 50% of the cases.

(4) Astigmatism is the cause of all sorts of disorders and unpleasant symptoms, eyestrain, headache, indigestion, etc.

(5) Children should be tested for astigmatism at the beginning of school life. The common practice of testing for other defects of vision and not for astigmatism is very unfortunate.

(6) The question of correction for astigmatism by the use of proper glasses is always an individual one, depending upon not only the amount of astigmatism, but also on the general health of the individual, the amount of work that must be done, and so on.

(7) In many cases perhaps the eyestrain of astigmatism becomes a conditioned stimulus for various unpleasant nervous and mental symptoms. The distress experienced by many literary men, in such work as reading and writing, may well be due in part to conditioned reflexes developed by the eyestrain connected with the work. This is probably the reason for the great benefit resulting from the correction of even a very slight degree of astigmatism in some individual cases.

BIBLIOGRAPHY

1. ABELSDORFF, G. Das Auge des Menschen und seine Gesundheitspflege. Leipzig, 1907, 90 p.
2. BEST, F. Ueber Korrelation bei Vererbung in der Augenheilkunde. Münchener medizinische Wochenshrift, 1907, No. 2. Reviewed by R. Rüdin, in Archiv f. Rassen- und Gesellschafts-Biologie, 1907, Vol. 4, pp. 106-107.
3. BURNHAM, W. H. Astigmatism. Monroe's Cyclopedia of Education. Macmillan, N. Y., 1911, Vol. 1, pp. 255-257.
4. GOULD, G. M. Biographical clinics. Philadelphia, 1903, 6 vols.
5. —— ——. Eyestrain and occupational disease. Proc. Congress of Hygiene and Demography. Washington, 1913, Vol. 3, Part 2, pp. 582-605.
6. KAYSER, B. Ueber den Stammbaum einer Familie mit Vererbung von Megalocornea nach dem Hornerschen Vererbungsstypus. Archiv f. Rassen- und Gesellschafts-Biologie, 1914, Vol. 11, No. 2, pp. 170-173.
7. LAURENCE, L. The eye. Orthos, London, 1908, 100 p.
8. NUEL, J. P. Astigmatisme. Dictionaire de Physiologie (Richet), Paris, 1905, Vol. 1, A-B., pp. 779-802.
9. STEIGER, ADOLF. Astigmatismus und Schule. Correspondenz-Blatt für Schweizer Aerzte, 1897, Vol. 27, pp. 289-298.
10. —— ——. Die Entstehung der spürischen Refraktion des menschlichen Auges. Karger, Berlin, 1913, 567 p. Reviewed by R. Schneider in Archiv f. Rassen- und Gesellschafts-Biologie, 1913, Vol. 10, pp. 806-812.
11. —— ——. Schule und Astigmatismus. Internationalen Kongress f. Schulhygiene. Nüremberg, 1904, Vol. 3, pp. 483-494.
112. —— ——. Studien über die erblichen Verhältnisse der Hornhautkrümmung. Zeit. f. Augenheilkunde. Vol. 16, p. 229, and 333. Reviewed in Archiv f. Rassen- und Gesellschafts-Biologie, 1907, Vol. 4, pp. 107-109.

13. Stocker, Friedrich. Die Augen der Schüler und Schülerinnen der Stadtschulen von Luzern. Jahresbericht über die Primar- und Sekundarschulen der Stadt Luzern. Burkhardt, Luzern, 1896, 71 p.
14. Tscherning, M. E. Physiologic optics. Keystone, Philadelphia, 1904, 353 p.
15. Thorington, James. Refraction of the human eye and methods of estimating the refraction. Blackiston, Philadelphia, 1916, 407 p.

PHYSICAL TRAINING AN ESSENTIAL TO THE BETTER HEALTH DEFENSE OF SOCIETY*

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Good health—good, active, aggressive health—is the most important thing in this world.

If you want some first-hand original information concerning the importance of health, go ask the man that has lost it. If you want an experienced estimate on its value, go to the woman that is trying to buy back the health she once had.

I suppose there is no family in the world that has not at some time or other experienced the mental, physical or economic losses that are due to poor health, preventable disease, or postponable death; and I suppose there is no individual in this world that has not or will not sooner or later feel those losses himself.

Good health is the most important thing in this world, not only for its own sake but for the larger reason that the full and complete measure of the success of every human enterprise depends upon the quality and endurance of the good health that supports it. The measure of your success depends upon the sort of health that backs up your enterprise, whether it be mental, moral or physical.

Have you ever thought over what the world loses every year—every day—because of poor health, avoidable disease, and premature death? The slaughter in the great war now raging in Europe has shocked us beyond expression. But every year of ordinary peace brings the world a greater unnecessary death rate and a greater preventable morbidity rate than accompany this great war. The ravages of weak health, of preventable disease, of postponable death are greater, far greater, year in and year out, than the ravages of this awful war. There are about 3,000,000 people sick in these United States in any given day. Something like 1,500 persons die daily of preventable disease in the United States. A comparatively small part of the earth's population is in this country.

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* An address presented before the Associated Academic Principals, State of New York.

I can't estimate the economic losses that occur daily or yearly because of inefficient health and unsuccessfully resisted disease. Great economists have tried but their estimates can never even approximate the real loss.

There are other losses of greater importance than the economic losses. They are world losses in intellectual output; losses in public service; losses in ideal commercial, professional, educational and religious progress; and, greatest of all, losses in human happiness—which follow this world-wide careless waste of human health and human life.

You must easily recall the names of great men whose usefulness to this country, or to some other country, and through such country, to the whole world, would have been continued at least for the period of an average life time had they been protected in health.

I do not know intimately very many communities represented here to-day. Perhaps I am not very well acquainted with a single one of the communities which you represent. But I know that no community exists or ever did exist that has not a long list of useful, public spirited citizens whose importance and value to the community was limited or cut short through poor health, preventable disease and postponable death. Your communities must have had such experiences.

If there were some way to save this human resource; some way to conserve these community assets for longer periods of time, would there be a community anywhere in this world that would refuse to go to any extreme for the purpose?

What would you not give if your father at sixty were as robust and active as Mr. X at eighty? What would you not give if that child of yours could have had enough vigorous health to have recovered from that last illness? What would you not give—but I need not ask—you know! I know!

Suppose there were some way in which you could reduce absences on account of sickness in your schools. Suppose you could secure an influence that would relieve your teachers of depressing, deadening fatigue and keep them off the sick list, would you be interested?

Nations, states, cities and even smaller communities, realizing the value of this human resource, have accomplished a remarkable progress in the prolongation of human life and in the reduction of poor health and the restriction of certain forms of disease. Morbidity rates are enormously decreased. The average duration of human life has been doubled in comparatively recent years. Wherever scientific knowledge and community resource have been brought together, we have found it possible to buy more health and longer life. Some years ago, in 1900, I believe—it was shown that the average

age of the rich Frenchman at death was fifty-seven years, while the average age of the poor Frenchman at death was thirty-seven years. The difference was—and is—due, not to the mere possession of wealth, but rather to the purchase by the rich of better sanitation and more effective protection from preventable disease.

Larger communities and more intelligent communities, have invested their capital in health protective measures and those investments are yielding large profits. I need only refer to Havana or Panama or to any one of a number of larger American cities to illustrate my point. Greater advance can and will be made along those lines but there is a limit beyond which the community cannot go unless it goes as a community of intelligent individuals of whom practically every one—not a bare majority, not a two-thirds majority but a near unanimity—practices regularly intelligent habits of health acquisition and habits of health conservation. There is a point or a line beyond which the power of community law and the might of the community's dollar cannot go without the help of community education. Beyond that line lies a region that can be reached only through the health education of the individual members of the community. That education must begin in childhood and it must be continued through the elementary and secondary school age. It must be an education for the fixation of intelligent health habits that will be practiced throughout the life of the individual.

Organized society may purchase the extinction of the malarial mosquito. It may buy the eradication of the yellow fever mosquito, the rat of bubonic plague, the tick of spotted fever, the fly of sleeping sickness or the louse of typhus fever or of trench fever. Organized society may buy clean pure water and it may purchase a successful food inspection. But it cannot buy habits of personal hygiene that produce human health; that defend the individual from disease and postpone his death. It cannot purchase health habits that give the individual resistance to disease, making it harder for him to become sick and easier to recover. It cannot purchase the personal consciousness of individual obligation in the health affairs of the community that is essential to an effective defense of the community health.

We have two ways in which we may successfully defend human life against poor health, preventable disease, and postponable death; two ways in which we may save our children, our kinsman, our countrymen and mankind in general from these merciless enemies of life, prosperity and happiness.

On the one hand, society may, and does, enact and enforce laws for the defense of the public against the insect, animal and human carriers of disease. It may and does provide opportunities for the community practice of health habits. In these and various other ways the community spends its resource and applies its scientific knowledge for the protection of human health and vitality through a control of environment and through a police supervision of social activities.

On the other hand, society may provide opportunities for public instruction in the principles and practice of health. It may offer school experience that lead to the establishment of intelligent health habits in school children and it may establish laws which make better health education mandatory.

Both these types of defense are essential to the safety of the public health. Neither one may achieve success without the other. Community hygiene depends on personal hygiene and personal hygiene is helpless in the absence of community hygiene.

It is only through a combination between organized community activity and intelligent, educated, individual support within the community that society may defend its health. The individual who acquires health habits, renders a community service.

We have here in the State of New York various sane and intelligent legislative enactments for the health defense of the commonwealth. These laws are being operated more or less effectively but their real use, their greatest value, will come only when the people of the State are possessed of a sufficient health education to enable them to understand, appreciate and co-operate with the State in its plans for the acquisition and conservation of human resource.

The health laws of the State to be effective must be supported by a people trained to understand and trained to obey these laws. The hygiene of the State as a whole cannot be better than the hygiene of the people who make the State. An effective physical training of the individual is then a contribution in the service of the State.

The legislature of this State in its session of 1916, went farther in this direction than it has ever gone before. It went farther than any other State legislature has ever gone to bring community hygiene and individual hygiene together. The legislature enacted laws which now make physical training mandatory for all the children in our elementary and secondary schools.

The legislature gave us a program of physical training that is now a part of the rules and regulations of the Regents of the University of the State of New York. This program is a plan for the health education of our children which the State Department of Education is obliged to supervise; it is a program which the schools of the State are obliged to operate; and it is a program whose operation the State Military Training Commission is obliged by law to inspect.

If you make this program effective in your school, you will thereby add to the health intelligence and the health habits of the individual members of this great commonwealth and you will meet your serious obligations to the health welfare of your pupils, your teachers and your community. And it will follow —it must follow—that the public defense against poor health, preventable disease, and unnecessary death, will become enormously more effective. It is the only way in which the defense may be made truly effective. If every school child is taught habits of health, every citizen will soon practice these habits. Our State laws on health will no longer lack the support that is essential to their success. An army will be added for the protection of the State in which every man, woman and child in the State will be trained for offense and defense in the campaign of the commonwealth against the enemies of its health, vigor and happy longevity.

The State program on physical training now before you is made up of three main divisions. These divisions are essential to the completeness of any effective plan for health education.

The first division deals with health examination—that is—with medical inspection. Personal health is on the average impossible in the absence of regular individual health examinations and consequent attention to the special health needs revealed by the examination.

The second division of the State program covers the instruction of the school child concerning the care of the body and the laws of health. With the successful development of this instructional relationship, we should be able in time to secure an intelligent understanding of the laws of health and therefore intelligent standards, intelligent co-operation, and intelligent aggressiveness on the part of society in its relation to the health problems of the community. The children you teach to-day will be influential voting citizens to-morrow. The health intelligence of the community to-morrow, therefore, depends on what you teach to-day.

The third division of the general plan is concerned with the establishment of health habits; particularly with habits of physical exercise for the various mental, moral and physical benefits that may be secured from such habits. Physical exercise in its various forms is perhaps the very greatest health habit we possess. Unfortunately, too many of us never learn the habit. If this State program succeeds there will appear a generation of citizens who will practice useful habits of active recreation.

The general program of physical training is now contained in the rules and regulations of the Regents. It includes the mandatory requirements of the State concerning health education.

The more detailed syllabus that accompanies the general program indicates to the individual school the various ways in which the general requirement may be met. As a rule, the syllabus contains a choice of programs under each division with additional instructions to the effect that the individual school may submit, if it desires, a syllabus of its own in conformity with the general program of physical training. If this syllabus so submitted meets with the approval of the Regents, it may be put in operation by the school authorities concerned.

The State program and its elastic syllabus for the rational application of its general plan of health education is before you.

You will find many obstacles in the way of rapid application but you will never find an obstacle that is worth permanence. Sooner or later, every interference with the operation of this program in its general scope must disappear. No people were ever given a greater or more significant opportunity than our State has here given us. We must get together and realize that opportunity.

Two million children fall under its influence to-day; two million lives may be prolonged; two million future citizens may be saved the loss of working days, of income, of productivity of civic and military usefulness and of happiness. And each year a new army of untrained children will come to you for health education. You can make these lives more useful and more enduring. Here is the way.

PRELIMINARY OBSERVATION OF TEACHING

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During some fifteen years and some seventy separate attempts in which the writer has been engaged in trying to find short cuts for teacher training students through the mazes of the theory and practice of teaching, the most baffling problem that has been recurrently encountered has been that of the efficient use and administration of the observation of teaching. In potential and actual value it is recognized as being second only to practice teaching; but the methods of using it economically are continually met by almost insurmountable obstacles such as large numbers of observers, conflicting programs of studies, inadequate facilities, and monotony of observation.

There is, of course, no single specific that can remove all the difficulties; but in later years the writer has come to place increasing reliance upon what may be called preliminary observation as a supplement to the other forms of observation. And since a rather careful examination of the literature fails to reveal a description of this specific, he takes the liberty of giving a brief analysis of the method.

There are at least three forms of observation. Of these the most frequently used is illustrative observation. The plan of administration is to first teach a group of methods and then to give the teacher training student the opportunity of seeing the methods illustrated in the classroom. This observation may be of two types. The teacher may have observation lessons taught immediately after each principle or group of principles has been developed; or, the students may be assigned to observe a class during a more or less extended period of time after the methods-of-teaching course has been completed. In many normal schools and colleges of education a period as long as six weeks or more is utilized for this latter purpose. But both the types are similar in that the methods are first taught and then the teacher training students are given an opportunity to see them illustrated in the practical handling of classes.

That these types are in such universal use is evidence of their value; but certain weaknesses are apparent to all teachers of methods. They call for the identification of principles, a sort of cataloguing and pigeonholing of classroom procedure, an interpretation of this bit of procedure as an illustration of one principle and that bit as an illustration of another. The unfortunate feature of this procedure is the fact that it involves a low level of thinking and attention. Since the teacher training student already knows the principle or the principles that he is expected to find, the observation soon grows monotonous and it frequently seems impossible to elicit enough thinking to keep the mind occupied. This is especially true of inexperienced teachers over whose head much of the subtler technique of artistic teaching passes unchallenged and unnoticed. So slight may the vitality of attention sometimes be that often, as any critic teacher can bear witness, the teacher training student, thinking that he knows what to expect, frequently reports the presence of a method which has not been employed.

A second form of observation that is used, though it is rather an attitude than a method, is critical observation. In this case the teacher training students observe lessons as critics would. They are concerned with both the observing of how a principle is applied and how efficient is its execution. This is a disastrous attitude for both the inexperienced teacher training student and the demonstration teacher; for the former has little basis upon which to judge of the success of the application since he has difficulty in seeing the application at all and thus he is likely to become a superficial snob who nonchalantly passes judgment upon teaching which he himself could not possibly equal. In the demonstration teacher this attitude, once it is realized by him, produces unnecessary strain if he is conscientious and humble, and irritation, suspicion, and antagonism if he is high-spirited and self-reliant.

Critical observation is of immense value to the observer who has passed through the ordeals of practice and who appreciates artistic teaching and the opposite when he sees it; and there must, of course, be some weighing of the success of a method in all observation. But immature teacher training students should be sedulously protected from the experience of watching teaching so poor that it has to be condemned. They should have the attitude of learners rather than critics.

The third form of observation is that referred to as preliminary observation in the opening paragraphs. It differs from both the foregoing forms in that instead of observing a lesson to see a principle illustrated after being learned, the teacher training student observes a lesson to discover a principle before it has been taught. This is the multiproblem method of teaching: the students are given a complex of problems the solution of which they are to work out for themselves. Observation in this form becomes an exercise used as a preliminary to the teaching of the theory.

The method used consists of six steps arranged in the following order:

The first step is the formulation of the principles to be taught. The teacher reads the references he is expecting to assign and from them selects those few important ones he expects the teacher training students to thoroughly master. These may be general or special methods of teaching, rules of educational psychology or facts of school management.

When the teacher formulates these items for himself he, of course, does not communicate them to the class since the object of the obesrvation is to have the teacher training students discover them for themselves. They serve two purposes for the teacher: they clarify his own objectives and they serve as a basis for his observation questions.

As an illustration of this, I select a series of reports by Superintendent Guy H. Capps (of Bolivar, Missouri) of work with his high school teacher training class.

The lesson was on the Technique of Story Telling. The reference used was Chapter IV of Bryant's *How to Tell Stories*. After reading the reference he decided upon the following points:

1. Know and appreciate the story.
2. Do not memorize the words of the story except certain important phrases.
3. Secure proper physical comfort, naturalness, proximity to the teacher.
4. Get into the mood of the story.
5. Keep the voice quiet and controlled.
6. Tell the story simply, directly, dramatically and with zest.

The second step is the formulation of a few observation problems, or, questions for the solution of which the teacher training student studies the methods of the demonstration teacher. To formulate these most efficiently is a difficult task. They need to be definite and clear. They must not be phrased so that the questions suggest the answers. In brief, they are subject to all the difficulties of oral questions and to the additional handicap of permanency, for once they are given to the pupils they can not be changed when they do not bring the correct result. It is found in practice, also, that even with the most skilful questions, the principles are sometimes, though not usually, difficult to discover.

The questions should be dictated and explained to the teacher training students when the assignment is made and the teacher training students will benefit by studying them so as to be thoroughly familiar with them when they observe the class. Often it is wise for the questions to follow some order other than that in which the teacher has formulated his methods as described in step one.

Superintendent Capps in the report just referred to formulated the following observation problems for his students:

1. Notice how the pupils are arranged? Why?
2. Notice the tones of the teacher's voice as she tells the story.
3. What seems to be the teacher's feeling toward the story she is telling? How can you tell?
4. How familiar is she with it?
5. Does she seem to have memorized the story or any part of it word for word?
6. Does there seem to be an "atmosphere" with the telling of the story? How is it secured?
7. Notice the manner in which the story is told.
   - (a) Is there "pep" in the telling of the story?
   - (b) Is the vocabulary suited to the children?
   - (c) Notice the amount of explanation of the incidents thrown in.

The third step is to arrange for a lesson by a demonstration teacher. The purpose of this lesson is to apply the principles to be discovered by the teacher training student. The purpose of the preliminary consultation with the demonstration teacher is to explain exactly what is desired of him. To this end it is found useful to provide the teacher with a copy of the formulated principles and of the observation questions.

The selection of both the demonstration teacher and the specific lesson to be taught is an important part of the plan. Usually the teacher knows which demonstration teacher can best illustrate the technique to be taught; some excel in one type of work, others in another. The selection of the lesson is difficult in many subjects because not all lessons involve the use of all the methods, and only those lessons can be taught which the children are prepared to study. Sometimes it is necessary to observe more than one lesson to get the full range of use of the methods to be studied and sometimes to observe more than one demonstration teacher handle the material.

The fourth step is the observation of the lesson. The demonstration teacher attempts to apply the methods, the teacher training students watch the teaching to discover the methods, so as to be able to answer the observation questions, and the teacher is in this case an active observer who stores his mind with the details of the lesson for use in the later discussion.

After the lesson has been taught, it is found beneficial for the teacher training students to ruminate upon the lesson and formulate answers to the questions in preparation for the class discussion. These are usually phrased in untechnical and inaccurate language but they serve a very useful purpose in that they form a good basis for later refinement.

The fifth step is the class discussion of the answers to the questions. In the discussion of the questions one by one it is found that some bright students have usually discovered the methods and average students discover a majority of them if the questions have been well phrased. But for purposes of formulation and the clearing up of difficulties each question usually requires some elaboration and discussion. The usefulness of the blackboard for exact formulation and systematization of the rules is obvious and it is found satisfactory for the formulation to be copied in note books.

It may be of interest to note that in a formal study of the ability of a high school teacher training class to detect the principles formulated by the teacher in advance, Superintendent Capps found that in five lessons taught with preliminary observation, involving the teaching of 27 points, 15 were discovered by the class as a whole and the other 12 had to be developed in part and that in five other lessons involving 31 points most of the points were discovered by the teacher training students though formal record was not kept. He is of the opinion that with more careful formulation of the observation problems the percentage of discovery could be materially raised.

The last step is the assignment and discussion of those textual references from which the teacher originally drew his formulation in the first step. The object of this lesson, for the teacher training students, is the verification and elaboration of their discovered principles. They approach the text with a point of view quite different from those who have not had the advantage of the preliminary observation. They do not study a theory of which they have now for the first time heard; they read material with whose substance they are already largely familiar and they look upon the textbook writer as a systematizer and compiler of what they have seen in practice rather than as a wizard who places materials before them of whose origin and previous existence they are blankly unaware.

The limitations of the methods of preliminary observation should be mentioned. It works only, or best, with teacher training students who are almost completely unacquainted with pedagogical theory; for the student who has a knowledge of theory will know what to look for and will miss the joy of discovery. If used as a universal method of approach it may become formalized. If, for instance, the method is constantly used, the teacher training student who works for grades and quick results and does not appreciate the pleasures of discovery may read ahead and get the principles from books either before or after the observation lesson and before the class discussion. Moreover, it is difficult, though not impossible, to find suitable illustrative lessons just at the time they are needed.

But the advantages of the plan as a variant form of observation within the limitations described make its frequent use advisable. The foremost advantage is the fact that it gives the teacher training student the advantage of approaching the subject as an investigator who in a vital manner feels the joy of discovery. This increases appreciably the level of his efficiency and produces the resultant satisfaction which develops self-reliance and initiative. Of almost equal importance is the fact that for those who are not bookish in their attitudes the material for study is, thus, widened so as to include not only books, but children and demonstration teachers and actual classroom procedure. It thereby makes a strong appeal to certain practical and motor-minded teacher training students who are eager to do the work of teaching rather than merely to study about it. And it steadies the practical operations of such students by teaching them to analyze classroom procedure and tie it up with interpretative principles and methods. It also makes the mastery of textual material easier because the teacher training student after preliminary observation reads the text with considerable familiarity with the items the text discusses. And, finally, it is economical of time. Superficially it would seem that time is lost if three lesson periods are consumed in observation, discussion of the observed lesson and later discussion of the text, when perhaps two would be used if the text were first assigned and discussion and observation followed. But, essentially, the hold upon the subject matter is increased in greater proportion than the difference in time indicates; and the text can frequently be covered in enough less time than would be used if it were studied *de novo* to neutralize even the superficial loss of time.

MILITARY TRAINING IN THE PUBLIC SCHOOLS

By Ping Ling

In these times of unparalleled storm and stress when all the national resources are being mobilized and all the public institutions are either requisitioned by the government or are themselves changing and reshaping their policies for the prosecution of the war, the educators in this country are constantly facing the problem: What can the public schools do in aiding the nation in this gigantic struggle? "We must win the war" is the sentence that springs to every lip and quickens the beats of every heart. But what can the schools contribute toward winning this war is the question which is pressing for answer.

Of all the war measures in which the schools can possibly take part, military training for the youth before he reaches his military age is a very important one. It is one which involves a great diversity of opinion among those who have been giving serious thought to the problem. The term military training is very elastic in its meaning and can be conceived by different people to mean different things. It is used alike by those who would like to turn the public schools into actual military camps and by those who would advocate the policy of giving the boys a broad physical education so as to enable them to become efficient soldiers later on when such general training is supplemented by technical military drill. Most of the pros and cons on this important problem are due to the different conceptions of the term rather than the uncompromising attitudes of those who discuss the two sides of the issue. The difference of opinion centers on the means and methods by which military training should be provided rather than its aim—which is to prepare the youth for efficient citizenship in peace or in war.

In collecting data on this important subject the writer has included in the questionnaire referred to in the other chapter the following question:

Have you military training in the high school, and if so, what, and how much time is given?

In addition to this questionnaire the writer has also endeavored to collect all the laws enacted or any bills being considered by the different state legislatures on this problem.

At the time of this writing very few states in this country have had any law concerning military training in the public schools, and only one state has made such training compulsory for all able-bodied boys of certain age who are now receiving free public instruction. But from the returns of my questionnaire we find that in practically every state of the Union there are at least some cities which provide an elective course of military instruction for a sufficient number of students who wish to take it. The kind of instruction offered and the amount of time devoted to it are of such diverse nature that it would be impossible to present them in full without greatly lengthening this chapter. For this reason I choose to present here only the salient features of the laws and practices which we find elsewhere in this country.

I. LAWS AND PRACTICES OF MILITARY TRAINING IN DIFFERENT SCHOOL SYSTEMS

Roughly speaking, the laws and practices of military training in different school systems can be classified according to the narrow and broad interpretations of the term military training. When it is taken in its narrow sense, it means that kind of training which consists of a few drills in each school week in the manual of arms and close-order formation. The kind of military training which we find in the public schools is very commonly of this type. When military training is taken in its broad sense, it means that kind of training which may not include military drill and yet whose main purpose is to give the youth such an all-round physical, moral, and mental development as to make him capable of rendering service to his country, either as a private citizen, or, after a short period of intensive drill in the training camp, as an efficient soldier. It is upon this distinction that the discussion in this chapter will be based.

1. *Laws providing military training in the public schools:* With only one exception the laws of the different states concerning military training are based on the narrow meaning of the term.

Arizona—A law providing for the organization, control and equipment of the state normal and high school cadet companies was enacted last year. The law provides:

a. The male students of any state normal or high school having thirty or more such students, fourteen years of age or over, shall be organized into a cadet company or companies.

b. The cadets shall be drilled in accordance with the drill regulations prescribed by the United States army.

c. Target practice shall constitute a part of the instruction to be given.

d. The training shall not exceed one-half hour each day.

e. For the organization and supervision of this work a Normal School and High School Cadet Commission shall be created.

Indiana—In March, 1917, the State Legislature passed a law regulating the system of military training but making no specification of the kind of training to be given. The two main points of the law are as follows:

a. Whenever a high school in the state institutes a system of military instruction, it shall be authorized to receive arms, ammunition and equipment from the United States government and pay out of the special school fund all the necessary expenses.

b. No system of military training or education shall be instituted or carried on in any school, unless the same be under the supervision of an instructor detailed for that purpose by the federal government, or a competent person certified by the state board of education.

Louisiana—An act requiring the teaching of military science and tactics in all the high schools was passed by the state assembly in July, 1916. The law reads:

"Section 1. Be it enacted by the General Assembly of the State of Louisiana, That, in addition to the branches in which instruction is now given in the public schools of the State of Louisiana, instruction shall also be given to the male pupils thereof whenever practicable in all grades higher than the eighth grade in the principles and practices of military science and tactics, especially with reference to the duties of the soldier and object of general military interest.

"Section 2. Be it further enacted, etc., That in all grades of the public schools of the state higher than the eighth, at least one hour a week shall be devoted to instruction, study and practice of military science and tactics."

Michigan—The Act requiring the establishment of an optional course of military training in all high schools in the state reads as follows:

"Section 1. Hereafter it shall be the duty of all boards of education or boards of trustees of school districts maintaining one or more high schools within their respective districts to establish a course of military training for such high school or high schools, such course to be optional with the students of such high schools: Provided, That nothing herein contained shall apply to cities or villages having less than five thousand population. . . .

" Section 2. Failure or neglect upon the part of any board of education or board of trustees of any school district to maintain a course of military training, as provided in this act, shall subject said board to removal from office, after a hearing with proper notice, by the State Superintendent of Public Instruction."

New Hampshire—A law was passed last year which authorizes the public schools to include military drill and physical exercises in the courses of instruction. But what kind of instruction and how much time should be given were entirely left to the discretion of the local school boards.

Oklahoma—The state law authorizes the local school boards to provide for military training, athletic contests between schools, and physical examination of pupils. The boards are also authorized to accept assistance from the war department of the United States and the National Guard of the state for the purpose of military drill and training. The law further provides that a Board of Control, consisting of five members, shall be created for the carrying out of these provisions.

Oregon—The state law only recognizes the military training in the public schools as lawful, but makes no further provision.

In those states where no laws have been enacted on this subject, many cities have taken special action for its introduction. The following resolution adopted by the school board of Pueblo City (District No. 20), Colorado, may be considered as typical.

" Resolved that Central High School maintain a prescribed course of military training extending through two years of the high school course. Such training to be open to all boys as a voluntary and elective study, provided that when elected, the study shall be continued for at least one year and shall not be dropped within that time except by permission of the school management for adequate reasons.

" The high school will give credit for military training to the extent of one unit of the total requirements for graduation, one half unit per year, provided further, that such credit shall be given on condition that the course in military training consist of not fewer than two hours a week for not fewer than thirty weeks of a school year and the conduct of a camp for not less than two weeks each school year.

" The actual teaching of the military training shall be done by a regular teacher in the school. When possible, the teacher shall be the teacher of physical education. This work shall be done, when such arrangements are feasible, under the direction and supervision of an officer of the regular army detailed for that purpose. The teacher shall make such preparation for this work as may be directed by the Board of Education."

The first and the only state which has enacted a law on military training in its broad sense is the State of New York. In 1916 the state legislature passed the so-called "Welsh-Slater" bills, making military and physical training compulsory in the secondary schools of the state for all boys above 16 and under 19 years of age. The essential points of the law are as follows:

The Military Commission—The law requires the establishment of a military commission composed of the Major General commanding the National Guard ex-officio, a member to be appointed by the Board of Regents of the university, and a member to be appointed by the governor. The duty charged to the Commission was that it shall "recommend from time to time to the Board of Regents the establishment in such schools (elementary and secondary), of habits, customs and methods best adapted to develop correct physical posture and bearing, mental and physical alertness, self-control, disciplined initiative, sense of duty and the spirit of co-operation under leadership."

Compulsory Physical Training—The law also requires the instruction in physical training and kindred subjects for all male and female pupils above the age of eight years in all elementary and secondary schools. The kind of physical training shall be determined by the Military Training Commission, and the time spent for it shall be not less than twenty minutes in each school day.

The private schools in the state are equally responsible for the giving of such courses as prescribed by the Commission. If any private school fails to establish and maintain such courses, attendance upon instruction in such school shall not be deemed substantially equivalent to instruction given to children of like ages in the public school or schools of the city or district in which the child resides.

Compulsory Military Training—With regard to military training the law requires that every able-bodied boy between the ages of 16 and 19 must receive military instruction in or outside of the schools. For the boys who are in public or private schools or colleges, the periods of military instruction are to aggregate not more than three hours in each week during the school or college year. For the boys who are outside of the schools, the periods devoted to military training are to aggregate not more than three hours in each week between

September first of each year and the fifteenth day of June next ensuing. Summer military training camps covering a period of not less than two or more than four weeks are to be established for the training of all the boys under the scope of the law at the expenses of the state. The law further provides that any boy who is lawfully employed in any occupation for a livelihood is exempted from this requirement unless he volunteers.

Critics of the bill advanced arguments against this last provision on the ground that it introduces a miserable class distinction in a public school system, for it associates military affairs with the people of leisure and means and perpetuates the idea that military life is not the business of a wage earner. Acting on the force of such arguments the legislature amended the law in the spring of 1917 in such a way as to include all boys of the said ages to be drafted for the service of the state. The amendment provides that the requirement for technical military training may be met in part, in the discretion of the Military Training Commission, "by such vocational training or vocational experience as will, in the opinion of the Commission, specifically prepare boys of the ages named for service useful to the state, in the maintenance of defense, in the promotion of public safety, in the conservation and development of the state's resources, or in the construction and maintenance of public improvement."

The significant point of this amendment is that it is in accord with the principle on which the national selective draft law is based. It provides for the defensive training of the soldier on the one hand and encourages the vocational training of the boys on the other. For the purpose of investigating and organizing the military equivalent services, a special Bureau of Vocational Training was established. It has been reported that the Commission is doing its best to carry out the provisions of the law both in letter and in spirit.

2. *Kinds of military instruction in different school systems:* So much for the school laws enacted by the state legislatures or special actions taken by the local school boards, now let us turn our attention to the actual practices of military training which have been in vogue for sometime in some places.

The kind of military training which narrows itself down to a few drills a week with or without arms has been very common wherever such training is given. As an illustration, the training program for the high school cadets of Salt Lake City may be worth noticing.

"Three drills are given per week. The drills are fifty minutes long, from 2:40 to 3:30 P. M.

"The school year, October first to May thirtieth, is divided into three periods.

"*First Period,* October first to November thirtieth.

"First year boys—School of the soldier, school of the squad; manual of arms, port and right shoulder, only.

"Ten minutes of each drill period is devoted to double timing and calisthenics with or without arms.

"Second year boys—School of the soldier, school of the squad, school of the company; manual of arms; competition in manual; some extended order.

"*Second Period*—December first to February twenty-eighth.

"First year boys—Manual of arms; school of the squad and company; care of and cleaning rifle; calisthenics with and without arms.

"Second year boys—Review of first period; pointing and aiming drills; extended order.

"During this period lectures are delivered to all organizations on the following subjects: First aid; outline of an army; military preparedness in the United States.

"*Third Period*—March first to May thirtieth.

"First month—Target practice; school of the company and battalion, close order; school of the company; extended order; compulsory combat exercises.

"Second and third months—Battalion parade and review; combat exercises, battalion; target practices; Governor's review."

Among the many schemes of providing a system of broad military training for the school youths the so-called "Wyoming Plan" has been widely heralded by newspapers and highly recommended by educators and military experts for its adoption elsewhere. The plan was originated in 1911 under the direction of Lieutenant E. Z. Steever at Cheyenne. The main feature of the plan is that it offers military training in the form of games. It takes the old lockstep, routine work out of military instruction and introduces into it the principle of competition, co-operation and play based on the natural tastes and instincts of adolescent youth. It utilizes competitive instinct without narrowing competition to the success or failure of any single individual. It develops the spirit of co-operation with ample opportunities for the development of initiative and individuality. It emphasizes the elements of play, yet the serious side of the training is never lost sight of. The whole system is so unique in its nature and so practical in its method that it may not be out of place here to describe some of its essential points in detail.

Training not Compulsory—Military training in Wyoming high schools is not compulsory. Indeed, Lieutenant E. Z. Steever does not believe that compulsion is necessary, because the fascinating nature of the military games will not fail to secure a large enrollment. The only regulation for this elective course is that, once a boy has selected his course for the year, he must finish it within that period.

There is no other expense for the pupil, except the purchase of a uniform. The State of Wyoming has appropriated a sufficiently large sum to assist the pupils in purchasing the uniforms at almost half of the original price. Upon receiving such state aid, the recipient must sign a certificate agreeing that he will refrain from the use of tobacco in any form.

System of Training—The aim of Wyoming system of military training is not to make soldiers out of the school boys, but to prepare them in such a way as to enable them to become the worthy defenders of the nation when they reach their manhood. For this reason great emphasis has been laid upon physical development and skill in military activities, such as wall-scaling, field firing, etc.; and the ordinary routine drills have been reduced to the minimum. Beside the regular practice of the different competition units, whose organization I shall describe later, instruction in sanitation, cooking, woodcraft, simple field engineering, scouting, patrolling, etc., is also given.

Organization of Competition Units—According to the Wyoming plan, all cadets are organized into competition units. These are wall-scaling, infantry drill, troop leadership, scholarship, field-firing, and other camp and field activities. In contrast to the common practice of ordinary school foot-ball or baseball teams, of the selected few of the entire student body, the Wyoming plan of organizing these competition units provides an opportunity for the participation of all who elect the course; each unit being made up of an equal number of strong, medium, and weak boys. Take the instance of wall-scaling. The last two men over the wall must be the strongest for they have to help the others over and go over themselves unaided. But no unit is composed of cadets who are all of the "Last-man-over" type. Suppose there are ten competition wall-scaling squads in the school, the twenty strongest students are selected from the cadets at large, and only two of them are distributed to each squad. In the same way the next twenty strongest are selected and distributed, and so on down to the twenty of the weakest. When the squad wins, everybody in the squad receives the same kind of reward and shares the glory of victory with equal pride and honor.

In case of inter-school competition no school is allowed to group its strongest men in one squad and let this little group to be the heroes of the day. Each school is required to send a list of all its cadets classified according to their ability to the office of the State Superintendent, and the latter assigns the cadets to different squads in accordance with the principle just mentioned. In case several squads are formed in one school, then they can compete among themselves. The winning squad of this intra-school competition will have the honor of representing the school in the big inter-school tournament.

It is quite obvious that the distinctive feature of the plan does not altogether lie in the system of military games, but in the way the games are played. It allows the weak as well as the strong to play the game and they all have an equal chance to win. The whole system of competition does not consist of marching one squad against the other as in ordinary school athletics, but it encourages one squad to excel the other in team work and accomplishment. One cadet's gain is not another's loss; when one unit wins, some other one does not go down in defeat. Yet each game requires all the energy, ability, skill, team-play and dogged determination of all the participants in order to score a victory. It was reported that once a cadet leader of a scholarship unit visited the other members of the unit night after night for the purpose of coaching them, and that finally his unit won the glory of an unqualified success. Such spirit of loyalty to the group, co-operation among one's associates, and indomitable will to excel others in achievement, are an inspiring illustration of the value of such a system.

Another interesting character in the organization of competition units is that the cadet leaders are selected by the vote of the older cadets at the beginning of each year. The leaders are chosen on the basis of ability and genuine leadership rather than on that of popularity. In case of the election of a popular but inefficient leader, the mistake will be effectively punished by the failure of the unit. The trust of real leadership is thus developed coincidentally with the spirit of self-subordination to the will of the group. This kind of civil training is not possible in any other military organization.

The adoption of the Wyoming Plan in other places—The Wyoming Plan of military training has been tried in many other places, but one of the most important experiments was made in Chicago. Shortly after the declaration of war, Captain E. Z. Steever with a corps of four lieutenants and sixteen sergeants of the regular army undertook to inaugurate the Wyoming system of military training in the high schools of certain cities within the central department of the army. Ten officers were assigned to the twenty-three high schools in Chicago. Various competition units were organized among the Chicago high school cadets, and the entire organization was ready in its working order at the beginning of this school year. As to the degree of success of such a trial no report is now available. But I have no doubt that such a simple, yet effective, system will not fail to win the confidence and support of the different school systems at this hour of national crisis.

II. Military Drill versus Broad Physical Education of Semi-Military Character

In the last section I have tried to make the distinction between military drill on the one hand and the broad military training on the other. Now we should like to ask a very fundamental question: Which one of the two possesses a greater value both from military and educational points of view? John Milton has defined "a complete and generous education as that which fits a man to perform justly, skillfully, and magnanimously all the offices, both private and public, of peace and war." What kind of military training will best accomplish this educational aim is the question we must carefully consider.

In answering this fundamental question the writer is prepared to say very definitely that he is opposed to the introduction of military training in the public schools if such training means only a few perfunctory drills a week. This view seems to have also been held by the majority of educators in this country who have made a careful study of the problem. The reasons for this view may be briefly stated as follows:

In the first place, mere military drill does not prepare a youth to become an efficient soldier. Through the ordinary military drill we may teach the boys to wear their uniforms properly, to keep their shoes shined, to march with 30 inch steps and with a rate of 120 steps per minute, to make proper movements when the orders of "Squad Right" and "Squad Left" are given, and to attain a fair degree of proficiency in the manual of arms. But none of these things are the essential part of a soldier's training. They are fragmentary and elementary in nature. They formed the most important part in the historic military drill practice, but have no functional significance in the modern war as now waged on the battlefields of Europe. Take, for example, the training in the manual of arms. How much practical worth has the proper execution of the "Right Shoulder Arms" or "Left Shoulder Arms" to a soldier when the battle is on? How much value has the training in the different classes of firing for the defense of a trench system when machine guns, grenades and other horrible weapons of war have to be used to meet the on-rushing foe? Take another instance, the matter of marching. Of what use is the training in the close-order formation when reinforcements have to be brought up to the threatening point through the communication trenches or in the dark? We can, indeed, be sure that all these kinds of training have very little military value in trench warfare, or in open field battle, or in the hand-to-hand struggle. At the beginning of the European War, it was reported that most of the Belgians who answered the call of their country had no military training whatsoever before they were sent to the front. Yet who would say that they have not made the most heroic defense at the most tragic hour?

However, I do not want myself to be misunderstood on this point as saying that the simple military drill is absolutely useless and futile from the standpoint of military efficiency. I do not for a moment deny the necessity of such drill for the preliminary training of a soldier. It gives discipline. It provides the training for mental alertness in responding to the command. It makes system and order possible in a military organization. It is very necessary that the draftees in the military training camps should be given such kind of training in order "to whip them into shape." But from the practical point of view it is the least important and can also be learned very rapidly and readily. The proficiency in the manual of arms and marching movements can be acquired by any person with normal intelligence within a short time. To substantiate my contention I may relate a case of a very recent date. On the last anniversary of the battle of Lexington twenty Chicago high schools were represented by over 3,200 members of their military training classes in a simple military marching competition. Not a single company had drilled more than four periods with their rifles and the maximum time drilled by the oldest company, both with and without arms, was less than twenty hours. Yet it was reported, "Every lithe, young body was erect, every head straight to the front; every rifle carried just so; every foot in step; every boyish heart set on putting over a win for his company and his school." (Maj. E. Z. Steever and Maj. J. L. Frink—The Cadet Manual, p. xii.) Whatever other value military drill may have, its introduction into the public school curriculum can not be defended on military ground.

In the second place, a few military drills a week do not give sufficient discipline so as to instil the habits of obedience in an adolescent youth. Captain L. C. Andrews has stated that the precise movements of the manual of arms and close-order formation are not for the purpose of learning how to get about on the battlefield—they will hardly be used at all—but they are for the object of training the mind and body of the soldier into habits of precise unhesitating obedience to the will of the leader. The drill-master commands "Right front into line," not because he wants his men in line especially, but for the purpose of exercising them in an exact performance of that particular movement, of habituating them to move exactly as he has ordered them. So the chief object of this simple drill is to make the obedience to command implicit and automatic. When this object is effectively accomplished, the difficulty in controlling the military units even under the stress of battle will be reduced to the minimum. This is a very brilliant explanation of the object of the drill. But military discipline is not and can not be maintained through drills alone. The habit of obedience can be made automatic only after a long process of training. The soldiers in the training camps live under military discipline in every waking hour of the day and seven days a week. Can the public schools exercise such military discipline over all the boys who are under their care? Obviously not. The schools have no control over the boys after the school hours. The most the schools can do is to require military discipline throughout the school day. But such a policy has not been adopted by any public schools in this country, as far as my knowledge goes. I would like to be convinced that the habits of obedience can be inculcated by a few drills per week and by a system of discipline which begins and ends with the drill hour.

Granting that this can be done. But whether or not the habit of obedience formed during drill hours can be transmuted into other fields is still a question open for investigation. Surely enough the boy learns to obey orders during drill hours, if the drill-master is a good disciplinarian. But he learns to obey orders of a specific kind and under a specific circumstance. Psychologists in recent years have generally denied the doctrine of formal discipline and agreed that the transference of training in one subject to the learning of another is very slight. How much can the specific habits of obedience to military commands be transferred into general obedience to law and authority is a question which can not be answered offhand. The New Jersey Commission on Military Training in High Schools has in its report made a very definite statement on this point. Thus it says: "The discipline of the schools aims, not at isolated acts of obedience under special circumstances, but at the habit of obedience to elders and persons in authority. It is a psychological fallacy to suppose that obedience to military authority, obedience exacted under any peculiar circumstances, may automatically be translated into the general habit of obedience." Even though such a statement does not represent the whole truth, it certainly gives us some food for thought.

Furthermore, military drill as conducted in some public schools has failed to maintain strict military discipline even during drill hours. There are many reasons for this, but the chief reason is the incompetency of the military instructor. Superior knowledge is one of the essential qualities of real leadership; and so of the drill-master. He must know his business, if he wants to command the confidence and respect of his men. He himself must know every movement and its proper execution of the drill before he can give the orders correctly and exact unhesitating obedience to them. This is too simple a truth to need any proof or illustration. But let us ask: How many schools are fortunate enough to secure competent men to conduct the military drill? With few exceptions city schools having military training have placed the responsibility of such instruction in the hands of the physical directors. Very few of these directors have proved themselves equal to the new task. They themselves never had the proper military training. They themselves even do not know exactly how the movements they order are to be executed. How can we expect them to be good disciplinarians? One can not fool the adolescent boys. Once they find out that the instructor does not possess "the stuff in him," discipline is hopeless. General Baden-Powell has once said: "Unless you have specially good instructors, amateur military discipline is apt to spoil the boy for standing the real thing when he goes into the service." Shall we "drill the schoolboy and spoil the soldier?"

In the third place, mere military drill does not develop a boy in physical prowess, alertness and endurance. Practically all experts on physical training have come out very strongly against military drill as a means of physical development. Abundant testimonies on this point can be cited, but I shall quote a few of the statements made by those whose opinions based on practical experiences and pedagogical insight should merit our special consideration.

Dr. Ehler, of the University of Wisconsin, says:

"Military drill is an enthusiasm-killing, contempt-developing treadmill. Preparedness involves, primarily and fundamentally, the possession of vitality, endurance, integrity of structure, and function of every organ, alertness, bodily skill, self-control, hardihood, courage; in other words, the fullest development of the physical, mental, and emotional powers, the result of real physical education. Let us not confound drill with training, nor substitute military drill for physical education."

Dr. D. A. Sargent, of Harvard University is strongly opposed to military training and states his opposition clearly and forcibly in the following words:

"Our principal objection to military drill as a physical exercise is that it does not to any extent meet the physiological demands of the body. In other words, it is not of sufficient interest as a means of physical development to arouse any moral earnestness and enthusiasm on the part of the boys. The exercise of the manual is not performed with sufficient force and rapidity to insure the energetic contraction of the muscles employed. It is essentially a one-sided exercise, bringing into excessive action the elevators of the right scapula, the deltoid, biceps, flexors of the forearm, wrist, and fingers of the right side; while the other muscles, excepting the legs on parade days, do not get sufficient employment to keep in good condition. It does not increase the respiration and quicken the circulation to a sufficient extent to secure the constitutional benefits that should accrue from exercise.

"During the drill the clothing is buttoned close around the chest and natural respiration is hindered. The muscles are not alternately contracted and relaxed but are tetanized, or kept in a state of prolonged tension. This, as we have seen, not only impairs the tone of the muscles used, but also puts an additional strain upon the brain and nervous system at the time when both should be as much relieved as possible. Finally, the mere exercise of the manual of arms does not give sufficient breadth and scope of movement to secure the co-operation of the muscles, and as a training for the central nerve system it is of little or no value.

"In reference to the gracefulness that is thought to characterize the movements of cadets, we can only say it is not the outcome of drilling and marching. The soldier is trained to square corners, straight platoons, and angular movements; curves and embellishments are not encouraged in speech or in action. If you would account for the graceful poise of our national cadets, you should visit West Point in summer and see them from one to two hours a day in charge of the dancing master."

For those who think that the course of military drill has not been fairly represented by the experts of physical education, the opinion of Captain H. J. Koehler, instructor of physical training, West Point Military Academy, is specially noteworthy. Thus he says:

"The use of the musket as a means of physical development for any one, be he man or boy, is more than worthless. It is, in my opinion, positively injurious. I deny absolutely that military drill contains one worthy feature which can not be duplicated in every well-regulated gymnasium in the country to-day. A thorough physical training develops all the necessary soldierly qualities to the greatest degrees and it does it without injury. If we have athletes, we shall never be without soldiers."

Experiments have made in a public school of London, England, for the purpose of determining the relative value of physical education and military drill, and the results are decidedly in favor of the former. Thus Dr. W. E. Darby, of London, says:

"It (physical training) should not be military, and for the following among other reasons: Because as a method of physical training military drill is both inadequate and injurious. Experiments, which were conducted in a public school, with a view to ascertain the relative value of gymnastics and of mere drill, showed that the average results yielded by the former were more than three times as great as those yielded by drill alone. Relatively, therefore, this method of physical culture is inferior. . . ."

Not only has military drill been condemned as a means of physical training, but it has also been shown as being actually harmful in its effect on boys who are too young to handle the real weapons and undergo the rigors of adequate instruction. Sir William Ailkin, professor of pathology in the army medical school of England has once said:

"Boys given military training at 18 makes soldiers who are less robust and efficient than men with whom this training was deferred a few years, remaining in civil life until after their bones, heart, lungs, liver, etc., were more matured and developed. Recruits at 18 show physical immaturity which results only too frequently in their ending in the hospital or being discharged as invalids. Recruits of 18 require two years' special training."

Finally, military drill in the public schools has been defended as a means of teaching patriotism. Now does it or does it not? To my mind, true patriotism can only follow the intelligent appreciation of the national and community life and of one's duty to the welfare of the group. To think that the simple military drill will cultivate in a boy a virile spirit, an ability and willingness to endure hardships, and a keener sense of duty to serve the community, the state, and the nation is nothing short of a great pedagogical illusion. The love of the country and the esprit de corps can never be aroused by having imitation military drills with broomsticks for the rifles, and school basements or small gymnasium floors for the drill grounds. If military training has any contribution towards the development of one's sense of responsibility, duty, and self-sacrifice, it must be real, it must be broad in scope and practical in nature. The technical drill which is the smallest and the least valuable part of soldier's preparation can never accomplish the object.

In the above few pages I have endeavored to show that military drill alone has no great value both from the military and educational points of view. It can not be the means of character building and physical development. What we need to-day is not the "Shoulder arms" and "Forward march" sort of drill in the public schools, but a broad program of physical education of semi-military character for all the youths of the land, so as to develop in them the physical qualities of health, vigor and endurance, the mental qualities of acumen, control and alertness, and the moral qualities of courage, co-operation and self-sacrifice, in the widest and best sense. All these qualities are at the foundation of good citizenship as well as of practical soldiery. Schools can not and should not be expected to perform the task of training soldiers in the strict military sense. But schools can and should train the youths in a broad and general way so as to make them physically, morally and mentally fit for fighting the battles of the nation when their service is needed. This task can be accomplished far more effectively by a well-devised system of vigorous physical training under discipline than by military drill.

Before we discuss the content of such broad program of physical education in the light of its practical value as a soldier's preparation and of its adaptability as a part of the public school curriculum, we may first direct our attention to the means and methods by which the European nations have been training their school youths under military age.

"Military instruction, of the exact nature and to the same extent as that given to soldiers, is not found in the schools of any country of Europe except the special military schools." In those countries where the system of universal military service exists the public schools often include military gymnastics in the course of physical education. But in no case have they ever attempted to substitute military drill for the well-established systems of physical training. We may take Germany, France, and Switzerland for our illustration.[1]

Germany—In Germany military drill was introduced into the city schools of Prussia as early as the beginning of the nineteenth century. But shortly after the Napoleonic wars, a thorough system of military preparedness for all males was adopted, and the matter of military training in schools was made no longer necessary. It was not until the outbreak of the European war that an emergency measure was undertaken by the schools to prepare the youths approaching the military age for their early service in the army. In 1914 a joint decree was issued by the Prussian ministries of war, ecclesiastical and educational affairs, and the interior, requiring that all boys over 16 years of age, not yet in active service, should receive preparatory military training for the duration of the war. In response to this decree many schools have introduced military instruction in connection with gymnastics as a part of the prescribed program. The time allotted to this work averages two hours a week.

Before the war, the German school youths could obtain military instruction only from voluntary organizations which have been in existence outside of the school. Among these organizations the federation of Jugendwehren (juvenile military organizations) is the best known. The chief purpose of this organization is to train the boys in long marches, field exercises, and maneuvers, as well as exercises in the activities of auxiliary corps of the army. It does not limit its membership to the school boys, but the great majority of its members are the pupils of various schools.

Next to Jugendwehren the organization of Pfadfinder (pathfinder) has had a very rapid growth in Germany. In 1912 the federation of pathfinders had a membership of 24,000, with 600 field masters. The training program of this organization is essentially the same as that of the Boy Scout.

Jungdeutschland (Young Germany) is another organization which tends to prepare boys of school age for military duty by means of exercises of a direct military character. It was organized by General Field Marshal von der Goltz in 1911, and its activities comprise drills, gymnastics, bicycling, marching, field exercises, patrolling, small feats of military engineering, etc.

France—Since the disastrous defeat of 1870 France has paid special attention to the preparation of her youth for military service. As early as 1880 physical training including military drill was made obligatory in all public schools.

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[1] For detailed information, see Military Training of Youths of School Age in Foreign Countries. U. S. Bureau of Education, Bulletin No. 25, 1917.

In the primary schools, the prescribed programs of military instruction are as follows:

"Middle division.—Exercises in marching, alignments, formation of squads, etc. Preparation for military service.

"Higher division.—School of the soldier without arms. Principles of the several steps. Alignments, marches, countermarches, and halts. Changing the direction."

In higher elementary schools, the "preparatory military exercises" consisting of advanced drills and maneuvers are added to regular gymnastics.

However, this system of military training as a component part of the prescribed course of physical education has not been approved by the leading educators in France, although it has been recognized as preparatory training for military service. Thus one authority says: "Military training involves serious inconveniences with regard to hygiene. It implies rigid discipline, which is condemned by true pedagogy. Outside of that it produces results that are only partial, limited and special."

Switzerland—Among all the systems of universal military service the so-called "Swiss System" has been highly recommended for its adoption in this country. The essential feature of the system is the provision of a short period of actual military training and the requirement of all public schools to give "Preparatory Gymnastics." In an Act for the military organization of the Swiss Republic, it was required that the cantons should provide for a course in calisthenics for young men during their attendance in the public schools, and this calisthenic exercise should be administered by instructors trained for the work either in the normal schools or in the schools for physical training. The law also provides that the Confederation would encourage all associations and all efforts toward the bodily development of its young men from the time of their leaving school until incorporated in the army.

In accordance with the provision of this Act, the preliminary military training is conducted in two forms: (1) compulsory preparatory gymnastics for all the boys during the entire legal school age; and (2) voluntary cadet corps; such corps for drill with arms, corps for drill without arms, and corps for target practices, are greatly encouraged by the government in various ways. Military training as we find in some school systems in this country does not exist in the public schools of the Swiss Republic.

Enough examples have been cited from European countries.

We may now take a few examples from some of the progressive states in this country in this connection.

New Jersey—Acting on the recommendation of the Commission on Military Training in High Schools the State Legislature passed a very comprehensive law in March, 1917, for the establishment of a state system of physical education in all the public schools. The general provisions of the law are:

1. A course in physical training shall be established and made a part of the courses of instruction in the public schools. No pupil can be excused from taking such training except those in the Kindergarten.

2. The time devoted to such training shall aggregate at least two and one-half hours in each school week.

3. Such course shall be adopted to the ages and capabilities of the pupils in the several grades and departments and shall include the following points:

a. Exercises, calisthenics, formation drills, instruction in personal and community health and safety and in correcting and preventing bodily deficiency.

b. Instruction in the privileges and responsibilities of citizenship, as they relate to community and national welfare, with special reference to developing bodily strength and vigor, and producing the highest type of patriotic citizenship.

c. For female pupils, instruction in domestic hygiene, first aid and nursing shall be added.

4. At the discretion of the state board of education, military training may also be included in such course. In case the said board decides not to include it, any local school board may submit the whole question to referendum vote.

California—The state legislature enacted a law concerning the organization and supervision of courses in physical education in the elementary, secondary and normal schools of the state in May, 1917. The law includes:

1. The board of education of each county, and city shall prescribe suitable courses of physical education for all pupils in the day elementary school and the board of high school district for all those in the high school.

2. The aims and purposes of such courses are: (a) "to develop organic vigor, provide neuro-muscular training, promote bodily and mental poise, correct postural defects, secure the more advanced forms of co-ordination, strength and endurance, and to promote such desirable moral and social qualities as appreciation of the value of co-operation, self-subordination

and obedience to authority, and higher ideals, courage and wholesome interest in truly recreational activities; (b) to promote a hygienic school and home life, secure scientific supervision of the sanitation of school buildings, playgrounds and athletic fields, and the equipment thereof."

3. A State Supervisor of Physical Education shall be appointed by the State Board of Education. He shall exercise general supervision over the courses of physical education and all the athletic activities in the public schools of the state.

Maryland—A law enacted very recently requires that all public schools must establish and maintain a course of physical education and training for pupils of both sexes during the following minimum periods: (a) in the elementary schools at least fifteen minutes in each school day and also at least one hour of directed play outside of regular classroom work in each school week; and (b) in public high schools at least two hours of directed play or athletics for all pupils outside of class work in addition to the one hour gymnastic exercises in each school week. For the purpose of carrying out this provision a State Supervisor was also provided.

Beside these three states, the General Assemblies of Rhode Island and Delaware have also enacted laws with regard to this important problem. But they are much less comprehensive and specific than those just mentioned.

In addition to these state legislations, a movement is now on foot to secure federal legislation for the establishment of a universal system of physical education throughout the country. In the Conference on Physical Education called by Commissioner Claxton at Atlantic City in February, 1918, the following resolutions were adopted.

"1. That a comprehensive, thoroughgoing program of health education and physical education is absolutely needed for all boys and girls of elementary and secondary school age, both rural and urban, in every state in the Union.

"2. That legislation, similar in purpose and scope to the provisions and requirements in the laws recently enacted in California, New York State, and New Jersey, is desirable in every state, to provide authorization and support for state wide programs in the health and physical education field.

"3. That the United States Bureau of Education should be empowered by law, and provided with sufficient appropriations, to exert adequate influence and supervision in relation to a nation-wide program of instruction in health and physical education.

"4. That it seems most desirable that Congress should give recognition to this vital and neglected phase of education, with a bill and appropriation similar in purpose and scope to the Smith-Hughes law, to give sanction, leadership and support to a national program of health and physical education; and to encourage, standardize and, in part, finance the practical program of constructive work that should be undertaken in every state.

"5. That federal recognition, supervision and support are urgently needed, as the effective means, under the Constitution, to secure that universal training of boys and girls in health and physical fitness which are equally essential to efficiency of all citizens both in peace and in war."

From all the evidence at hand we may safely say that the general tendency in this country is towards the introduction of a broad system of physical education into the prescribed school curriculum instead of military training in its narrow sense. This is the only sensible thing for the schools to do, because they lack the time, the means and the professional ability to provide a genuine and real system of military training comparable to that given to the soldiers. Now we may ask: What kind of physical education should we adopt in order to achieve the purpose of preparedness?

Copious literature has been written on this problem in the past two or three years, and many valuable suggestions have been made. In some places the measures of health examination, provision of healthful environment in home and school. and instruction in health problems have been included in the program of physical education. Broad as this conception of physical education is, I wish to suggest the incorporation of the program and methods of the Boy Scout in any scheme of physical training which may find its place in any school system. This is not the place to discuss the Boy Scout program. But from the military and educational points of view, we may see what contributions scouting education does have to offer.

In the first place, scouting offers the very best training in the military sense to the adolescent youths. Experience teaches us that modern military training is an exceedingly complex affair. A good soldier must have not only strong physique, great endurance, and knowledge of military tactics, but also practical ability in doing many things upon which the efficiency and success of an army depends. He must know how to build roads, put up his tent, and take care of various kinds of motor machines. He must know the principles of personal hygiene, first aid, and camp sanitation. He must know how to take care of himself, such as what to do about a blister and how to cook a simple meal. All these and many other things are the fundamentals of a soldier's training; and these are the very things which the scout program includes. As an illustration of this point, the introductory statement in the Boy Scouts' Handbook (1917) is very noteworthy.

"A Scout! He enjoys a hike through the woods more than he does a walk over the city's streets. He can tell North or South from the moss that grows on trees and East from West by the shadows that trunks and branches cast. When matches are forgotten he laughs and proceeds to kindle a fire by rubbing two sticks together or by striking steel on flint. The fire once started, what a breakfast, dinner, or supper he can prepare out there in the open! Does he enjoy the meal? Just watch him and compare his appetite with that of a boy who lounges at a lunch counter in a crowded city.

"A Scout does not run away or call for help when an accident occurs. He devotes all his strength and energy to assisting those who are in need. If a person has been cut he uses his first aid knowledge in stopping the flow of blood, gently and carefully binds up the wound, then, if necessary, he seeks other assistance. If a person has been burned his knowledge tells him how to alleviate the suffering. If any one should be dragged from the water unconscious, a Scout at once sets to work to restore respiration and circulation. He knows that not a minute can be lost.

"A Scout can talk to a brother Scout without making a sound by signaling with flags; or by tapping on a log he can imitate the click of a telegraph key, and in either manner he can spell out words and sentences.

"A Scout can tie a knot that will hold, he can climb a tree, the ascent of which seems impossible to others, he can swim a river, he can patch a tent, he can mend a tear in his trousers, he can tell you what weeds are poisonous and what are not, he can sight nut-bearing trees from a distance; if living near ocean or lake he can reef a sail and take his trick at the wheel, and if near any body of water at all he can pull an oar or use paddles and sculls; in the woods he knows the names of birds and animals; in the water he tells you the different varieties of fish."

In the second place, scouting education offers the very best means of character building. Dr. James E. Russell, in commenting on scouting education, once said: "As a teacher, I take my hat off to Sir Robert Baden-Powell, the genius who in a decade has done more to vitalize the methods of character training than all the schoolmen in this country have done since the Pilgrims landed on the New England coast." In the public schools we teach the precepts and neglect the practice. We preach the virtues but lay no emphasis upon participation. We know full well that mere instruction is ineffective in character building, yet our indolence has always made us follow the line of least resistance. But scouting education just reverses our common practice. It teaches the boy to translate the Golden Rule into concrete deeds and thus enables him to incorporate it into the fabric of his moral life. On becoming a tenderfoot every boy must take the scout oath: "On my honor, I will do my best (1) to do my duty to God and my country and to obey the scout law; (2) to help other people at all times; (3) to keep myself physically strong, mentally awake, and morally straight." This simple oath has a very significant meaning to the boy. It means the solemnity of the occasion on becoming a scout. It means that he must do something to fulfill his duty. This oath is further reinforced by the twelve commandments stated in positive terms. The scout is trustworthy, loyal, helpful, friendly, courteous, kind, obedient, cheerful, thrifty, brave, clean and reverent. Each one of these laws sounds a bit grandiloquent, but it is illustrated by the simplest and most concrete duties of a boy's life. The scout's duty is to do a good turn daily, but he does it on his own initiative and out of his own free will. In contrast to the military discipline, which is always mechanical and autocratic, the scouting program seems to be so nicely adjusted and so evenly balanced as to inculcate the spirit of self-subordination and the habits of obedience on the one hand and to provide ample opportunities for the development of originality and leadership on the other.

In the third place, the means and methods of scouting education appeal to the boy's interest and are adapted to the boy's nature. The boy in his early teens is essentially a savage. He has an abundance of energy and a great variety of interest. He is a great explorer. He loves adventure. He seeks opportunities to give expressions to his inner cravings and instinctive desires. School is exceedingly irksome to him, because pedagogues are often short-sighted and pinheaded and do not know how to supply his psychic needs. From this psychological point of view we find the secret of success of the Boy Scout movement. It gives the boy a chance to make use of all his powers, physical, mental, and moral. It directs his interests to the right channel and at the right ends. It makes him self-reliant yet obedient, courageous yet restrained, virile yet courteous, aggressive yet always respectful for the right of others.

Most of the scouting activities are in a form of play, and most of the play is to be had out of doors. There the scout may play the part of an Indian, or a frontiersman, or a cowboy, to work off his wild spirit in the most wholesome manner. There he learns about the stars, the moon, and the sun, about the frost, snow, rain, clouds and winds, about the trees, flowers, birds, and insects. There he explores the country and finds out every path and by-path. There he learns to use properly his eyes, ears, nose, and senses of taste and touch. There he is taught to deal with various accidents —ice-breaking, electric shocks, drowning, run-away carriages, and so on. There he must prove that he can make a fire with or without matches, cook a hunter's stew, skin and cook a rabbit, or pluck and cook a bird. There he acquires the knowledge of scores of other activities which are susceptible of direct and immediate application to everyday life. The best thing about this whole scheme of training is that "every task in scouting is a man's job cut down to a boy's size." It appeals to the boy's interest because he wants to "behave like a kid, but be treated like a man." If the interest of the children should be the first consideration of modern education, the means and methods of scouting seem to be well-nigh pedagogically perfect in every respect.

From the standpoint of preliminary military training and sound pedagogy I have praised the scouting program and method and urged the incorporation of scouting activities into the school curriculum. But with regard to the entire system of broad physical training the following general outline may be offered.

1. The school day must be greatly lengthened. Seven or eight hours a day and six days a week should be a possibility.

2. For the children between 6 and 12 years of age, at least half of the school day should be given to physical exercise and organized play.

3. For the children between 12 and 16 years of age the program and method of the Boy Scout should be adopted. The physical director should be the scout master, and every boy should be made a "good scout." At least from 15 to 18 hours a week should be given to the activities of scoutcraft. Two whole afternoons a week (perhaps to include evenings too), say Wednesdays and Saturdays, should be made available for long hikes, trips to swimming places, etc. Week-end camping may also be possible.

4. For the boys between 16 and 18 years of age, the Wyoming system of military training may also be included in the program in addition to those activities just mentioned. Summer camps covering a period from four to six weeks should be established at the expense of the State, and their attendance should be made obligatory to all boys. In these

camps intensive military training should be given and strict military discipline should be maintained. In this connection the program carried out by the Military Training Commission of New York State last summer should be worthy of adoption.

In conclusion, I may say that (a) the kind of military drill which we find in some school systems in this country has no place in the public school curriculum. It is a sheer waste of time, and has no value, either military or educational. (b) A genuine system of military instruction, of the exact nature and to the same extent as that given to the soldiers, can not be provided by the school for lack of time, means, and professional ability. It has not been found in the public schools of any country in Europe. (c) A broad program of physical education of semi-military character should be adopted by all the schools in the country. It may necessitate the reorganization of the systems of school administration and school instruction to some extent. But we should spare no effort in putting it into practice, if it is workable. "Better citizenship" is the educational slogan of to-day; and a good citizen can never fail to be a good soldier.

MORAL TRAINING OF SCHOOL CHILDREN IN WAR TIME

By Ping Ling

John Ruskin said in his Crown of Wild Olive:

"When I tell you that war is the foundation of all the arts, I mean also that it is the foundation of all the high virtues and faculties of men. It is very strange to me to discover this, and very dreadful—but I saw it to be quite an undeniable fact. The common notion that peace and the virtues of civil life flourished together, I found to be wholly untenable. Peace and vices of civil life, only, flourish together. . . .

"I found, in brief, that all great nations learned their truth of word and strength of thought in war, that they were nourished in war and wasted by peace, taught by war and deceived by peace, trained by war and betrayed by peace—in a word, that they were born in war and expired in peace."

In these times of unprecedented world struggle when the traditions of centuries are crumbling and all the ideals of civilization are being tested in the infernal fire of war, these words of a philosopher and a great lover of art are most challenging. They are challenging, because they compel us to turn our thought from the present horrors of war to the possible future social order which may rise from the indescribable chaos of to-day. Looking from the dark side of the war, the world is in a period of great conflagration. Every human effort is being directed to the scientific inventions of frightfulness and destruction. Every advance in science and engineering makes war more hideous and every advance in organization and efficiency makes it more terrible. The shrieking of the drowning women and children on the high seas and the shelling of quiet homes seventy or eighty miles away are only a few of the examples of the terrors of modern warfare. For the time being at least it seems that the whole world is going to come to an end. But looking from the bright side of the war we find that war has served as a great agency for the re-evaluation of life, for the advancement of civil virtues and for the enhancement of high moral ideals, despite all its destructive effects. Never before have we seen so many evidences of love and sympathy, of devotion to duty and consecration for service. Never before have we heard so much of the deeds of heroism and self-denial, of bravery and discipline. Never before have we found so many examples of loyalty, co-operation, and the willingness of paying the last measure of devotion for a great cause. We have every reason to hope that this war will prove to be a great atonement for the world, that the heroic blood shall not have been shed in vain, and that a new social order shall be established which will for ever hold the brute in man in leash. It is upon this inspiration that I propose to discuss in this paper the ethical values of war from an educational point of view, and particularly those object lessons which are exerting a profound influence on the character and inner life of the children upon whose education and training the future of the world depends.

The teachers of to-day are largely responsible for the world of to-morrow. They are training a generation not only for the wise maintenance of the coming peace but also for the just and faithful applications of the moral lessons we have learned from this war. Nations as well as individuals will soon forget the truth and the ethics which have been brought so vividly and lucidly to light by the immediate conflagration, and let the lower passions of vain glory, petty jealousies, and selfishness again loom large in our national and individual life. But, lest we forget, we must never go back to the old order of things; we must never let the war lessons so dearly and painfully learned be relegated to the place of oblivion; and, the most important of all, we must teach children these lessons so that the truths and the ethical virtues brought out by war may be incorporated in their moral fibre and may thus become a moulding force for the future. This is a great task, a task which requires vision and pedagogical insight to perform. Woe be unto the pedagogues if they fail to comprehend their duty and responsibility to discharge it with faith, fidelity, sagacity and professional ability!

In discussing the problem of moral training of school children in war time the writer is fully aware of its immensity and complexity. In times of peace the ethical training in the public schools always proved to be a difficult thing, because there was a lack of paramount motives to hold the interest of the children. But in times of war the condition is different. We can construct our entire method of moral training around the main theme of patriotism. In patriotism the children will find motives in doing things and can learn many fundamental virtues through their actual participation in the war activities of the school. For this reason I shall present this subject in the following two sections: namely,

(1) the teaching of patriotism and (2) the training of patriotism.

I. Teaching of Patriotism

The first task the teachers must perform is the teaching of patriotism. It is not a new task imposed by the war, but the war has made it more important and necessary. To fail in stimulating the patriotic feelings in children would mean a failure in one of the main functions of the school. But how to teach patriotism in connection with the war is the question which we have constantly asked and to which we yet have no answer. To my mind, the fundamental solution of this problem presupposes a clear conception of what true patriotism is. To conceive it in its highest and best sense, the teaching of it will be beneficial both to the individual and to the nation. To conceive it in a wrong perspective, the teaching of it, no matter how patriotic the teacher may feel, would be poisoning the minds of the children and doing a nation more harm than good.

Now what is patriotism? To say that patriotism is love of country is begging the question, for the phrase "love of country" needs further explanation. Is the hatred for the enemy to be identified as true patriotism? Is the exaltation of the nation's greatness to be interpreted as real love of country? With all emphasis we must say "no." To conceive patriotism in such terms would be nothing short of a horrible perversion. In an autocracy the conception of patriotism can not be anything other than the exaggerated national egoism and the contempt of other peoples, because the autocratic rulers must deliberately educate their people into such a frame of mind in order to further their imperialistic design. But in a democracy, we must conceive patriotism as an unqualified devotion to the ideals and institutions of the country which guarantees liberty and justice to all. It is upon this higher and nobler conception that we must formulate our principle of instruction.

Avoid the teaching of hatred—Hatred for the enemy has no place in the teaching of the war. We have heard so much about the teachings in the public schools of Germany concerning her enemies, but we should not follow her example. Indeed, we should constantly guard ourselves against the temptation of introducing into the public schools any teachings which are not in harmony with the democratic ideals for the defence of which we are making a supreme sacrifice. America entered the war with no selfish purposes, so we must carry on the war without passion. The righteous indignation against the Germans which we must all feel at present must never be degraded into simple racial hatred. We must not let our feelings blind us to our pedagogical duty which is to educate, to train, and to prepare the children of to-day for the world-citizenship of to-morrow.

As regards the kind of patriotism taught in the German schools since the war began we find that hatred for the enemy has been the dominant feature of all class-room instruction. In Germany, Nietzsche's phrase that " war and courage have accomplished greater things than love for one's fellowmen " has been handed down to the coming generation with fresh and immediate significance. " War glorified the one ultimate and vital aim of life " and " God punishes the enemy " are the few topics that millions of German school children are daily listening to. The German instructor is teaching his classes that the Germans are fighting like heroes against Händler, as warriors against mercenaries, as people in arms against the slaves of mammon (England) and of the mean desire for revenge (France). He is also putting into the minds of the pupils that the peoples of all other nations—not allied with Germany—are cowards, liars, slanderers, and degenerates and that Germany alone stands for truth and righteousness. National unity has been the chief emphasis of the German school. It appears to be the distinct aim of the German authorities to create a spirit of blind uncompromising chauvinism in the hearts of the children so as to make them to think as one and to hate as one the democratic world.

Not only the schools, but public lecturers and pastors are also interpreting the meaning of the great war according to this point of view. In a book published by a German pastor, which was supposed to be a collection of the teachings of Germany's poets, prophets, teachers and preachers, chiefly the latter, the following paraphrase of the three petitions of the Lord's Prayer may be very interesting:

" Though the warrior's bread be scanty, do Thou work daily death and ten fold woe upon the enemy. Forgive in merciful long-suffering each bullet and each blow which misses its mark. Lead us not into the temptation of letting our wrath be too tame in carrying out Thy divine judgment. Deliver us and our Ally from the infernal enemy and his servants on earth. Thine is the Kingdom, the German land. May we by the aid of Thy steel-clad hand achieve the power and the glory."[1]

Teachings such as these, impressed upon the mind of the youth, will not fail to create a spirit of hatred toward Germany's enemies of to-day which will not only endure but will also hinder all plans of permanent peace. From every point of view we must condemn such practices as short-sighted, ill-advised, and unworthy of any pedagogical consideration.

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[1] Bang, J. P. Hurrah and Hallelujah, New York, 1917.

From the pedagogical point of view, teachings like these will only tend to perpetuate the ill-feelings among the warring nations for many generations to come. This great world war must be considered as temporary and the reconciliation of the peoples must be inevitable. The great task facing the educators to-day is not to preach hatred in the midst of the present world-war, but to guide the youth in his moral development and to prepare him for the great future responsibility of human civilization. We can not very effectively teach children to love our enemy, because the hatred for the enemy and the pride for our victory are instinctive with children. They come very naturally. They can not be entirely suppressed by mere instruction. But we can at least guide children to see the significance of mutual dependence among the nations to enhance world civilization and to enrich our social inheritance; we can at least direct their patriotic feelings to have proper and adequate expression in duty and service; and we can at least teach them to treat our enemies according to the principle of justice and fair play with which we wish ourselves to be treated. Hate is one of our inherited instincts. To excite hatred for the enemy among children, who can not reason logically and who can not see things in their right proportion, is one of the easiest things in the world. An idiot can do so. Why should we try to develop this baser instinct in children and thus increase the chances for the resumption of the horrors of war when the present war is over?

Furthermore, to teach hatred would be to increase the demoralizing effects of war upon the inner life of children Evidences are not lacking that numerous psychoses have developed among the children who, on account of their residence near the fighting front, have been receiving the frightful impressions of death and destruction. Their emotional life has been profoundly affected by the great shell-shock of the war. They are developing their cruel instincts and harmful habits which are definitely detrimental to the normal growth of their moral character. In view of this fact the true war-pedagogy is to find out the ways and means to counteract the evil effects of war and to obviate the dangers which may rise from the daily events of the struggle. On discussing the new educational duties of our time, Prof. F. W. Foerster has made the following statement: "A girl in her teens comes from a street-corner where the German naval victory off Chile is posted and says jubilantly to her friends, 'Have you read? Magnificent! Fifteen hundred Englishmen drowned off Chile!' I do not consider such things harmless. For the stay-at-homes war can become a school of heartlessness and thoughtlessness if a very earnest counter-effect is not given at the right time. As a teacher, I would, on such an occasion—or even beforehand as a precautionary measure—say with great emphasis, 'Listen, whoever is not yet so fortunate in these war times as to be permitted to bind up wounds and nurse the wounded, shall at least *think* of the wounds which war inflicts and of the broken hearts and happiness of the thousands who thereby lose what is dearest to them—therefore, even in our joy over victory, there should always sound a minor note. Do you know what "Minor" means and how it can be expressed? What a loss for us if the others should lose their ships, but you should lose your hearts!' "[2] Such an admirable statement from a far-sighted German educator should serve as a grave note of warning to the teachers in this country who are encouraging their pupils to maintain a malicious, scornful and brutal attitude towards the enemy. To be sure, the grim realities of war have not come to the daily experiences of the average American children. But the time is coming, if the war lasts, when the American heroes will lay down their lives on the fields of honor by hundreds or thousands a day, then their dear little ones at home will not fail to have some emotional experiences which are appalling to their growing childhood. Is it pedagogically or psychologically sound that we should teach them to indulge in hatred and malice, which are not beneficial to the nation and decidedly harmful to themselves?

Avoid the Teaching of National Egoism—The undue exaggeration of the nation's greatness should be carefully avoided in the teaching of patriotism. The fundamental reason for which Germany started this world war is just because of her belief that she is the only nation in the world that is fit for existence. For many decades the German government has been using the public schools as the chief instrument for educating the people to believe in the doctrine of "Deutschland ueber Alles." In no country has the government more direct control over education than in Germany. In no other country has education been made so subservient to political aim which is to put the world under German domination. Everywhere in Germany the children have been taught to think that the Germans are the "Chosen People of God" to rule the rest of the world. Had the Germans been trained to respect the right of others, this great catastrophe would have been impossible.

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[2] Prof. F. W. Foerster. New Educational Duties of Our Time; translated by Helen M. Downey. Pedagogical Seminary, March, 1918, p. 80.

In order to show the extent to which the minds of the German children have been poisoned the following quotation from a letter written by a school girl, a daughter of the State Councilor of Architecture, to a friend in Switzerland may be worth noticing:[3]

" It is evident that you, a Swiss girl, with your French sympathies, can not understand how my heart, the heart of a young German girl, passionately desired this war. Speaking of it some years ago, my father said to us: 'Children, Germany is getting too small for us; we shall have to go to France again in order to find more room.' Is it our fault if France will not understand that more money and land is necessary for us?

"And you reproach us that our soldiers have been very cruel to the Belgian rabble, and you speak also of the destruction of Rheims, and of the burning of villages and towns. Well, that is war. As in every other undertaking, we are past masters of war.

" You have a great deal to learn before you can come up to our standards and I assure you that what has been done so far is a mere bagatelle compared with what will follow.

"As a matter of fact there is but one race worthy of ruling the world and which has already attained the highest degree of civilization. That race is ours; the Prussians are undoubtedly the lords par excellence among the Germans.

"All other nations and among them, unfortunately the Swiss, are degenerate and of inferior worth. That is why I have always been so proud of being a true Prussian.

" Yesterday, again, our pastor explained to us convincingly that our first parents, Adam and Eve, were also Prussians. This is quite easy to understand, because the Bible tells us that the German God created all after his own image. If then, all men are descended from Adam and his wife, it follows that only Prussians, or at least Germans, ought to exist in the world, and that all those who push on and prosper ought to belong to us. You must admit that that is logic and that is why our motto is, 'God with us. Germany above Everything.'

" You know now why we wished this war. Is it not shameful that other nations, who have no right to existence on the earth, wish to diminish our heritage! We are the divine fruit, and the others are only weeds. That is why our great Emperor has decided to put an end to all these injustices and to extirpate the weeds. Do you understand now?"

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[3] The Red Cross Magazine, April, 1918, p. 72.

From the above few paragraphs of the naïve expression of a school girl, we perhaps know more about the frame of mind of the average German people, yea, even their political philosophy, than from reading volumes of literature on the same subject. As a rule the German people have been so much obsessed by their military success that they can not distinguish between right and wrong. It is not an exaggeration to say that Germany has become a land of "dead conscience," and for this her public schools are largely responsible. The teachers of the American schools must not be blinded by their patriotic feeling of the moment and fall into such error.

To teach children that their country is the best in the world in every thing is not teaching the truth. No nation is all good nor all bad. Every country has its shortcomings as well as its achievements. The great world civilization is just like a beautiful mosaic picture, each nation has made its contribution. Every nation has its own ideals, traditions, customs, morals and virtues, which may be utterly different from those of others; yet it is upon these very differences that the advance and the enrichment of the world civilization depends. Teachers must lead children to recognize these differences between nations and help them to realize the deep underlying unity that binds all nations together. The great fundamental principle of a democracy is to allow the individuals to differ; so the great democratic world must allow the individual nations to differ. America is devoting everything, man, money and resources, to making the world safe for democracy; so the school teachers must assume the responsibility of developing a sort of corporate conscience in the younger generation in order to maintain the great world democracy which is bound to come. Their accomplishment may not be so spectacular as that of the heroes in the field, but it is in no sense less important.

Furthermore, true patriotism does not consist of a romantic view of country. It must be sane and modest. It is of the same nature as the love which we have for our parents, as one writer puts it. We know that our parents are not perfect human beings; so one must recognize the fact that his nation is not a perfect nation in everything. Nevertheless, one can love his country just the same, even though it is not perfect. As we must and we will defend our parents from violence, so one must defend his country from any foreign encroachment. Why should one insist upon the idea that his country must be the finest in the world in order to fight for its right and honor?

The sentiment which expresses itself in the phrase, "My country, right or wrong," is not the kind of patriotism we should teach in the public school. It has the same meaning as "Deutschland ueber Alles." It is nothing but a projection of the selfish ego on a larger horizon. To carry the analogy a few steps further, we can say, "My country, right or wrong; my state, right or wrong; my county, right or wrong; my city, right or wrong; my family, right or wrong; and finally, myself, right or wrong." It literally means that selflove recognizes no law, and patriotism knows no principle of justice nor international obligations whatsoever. How absurd!

However, this popular phrase had a very innocent origin from an American naval commander, Commodore Decatur, just about a hundred years ago. In a banquet given in his honor, after his historic expedition to the Mediterranean, he was called upon for a toast. He responded by saying: "Our country! In her intercourse with foreign nations, may she always be in the right; but our country, right or wrong." Considering the position of Decatur, this sentiment was a very noble one. Decatur was a naval officer and his chief duty was to obey. His statement meant substantially this: "I hope my country in her foreign quarrels will always be in the right; but be she right or be she wrong, I as an officer of her navy have no choice but to execute her commands."[4] This is a good sentiment for a soldier, but not for a citizen. The former has to do what his country orders him to do, while the latter must see to it that his country is in the right in her course of action. The duty of the former is to obey, while that of the latter is to decide. It is not a virtue for a citizen to think that his country is right, when it happens to be wrong. But right or wrong, he can still love his country for what it is and what he owes to it. Teachers who have the sacred duty to prepare children for good citizenship must conceive patriotism in the sane and modest way, otherwise the teaching of it will be pernicious and destructive to the democratic ideals America is defending. George Mallory in a pamphlet addressed to the British boys and girls with regard to their duty in war time has urged them to think for England, and to think what is *right* for England. Thus he says: "When she (England) is proud she must be pitiful; when she is angry she must use moderation; when she loves she must be kind; when she hates she must still see what is just; if her place is peculiarly fortunate her conduct must be peculiarly blameless; if she is strong she must admit a fault; if she is free she must be generous. And truly to love England means precisely this: that we wish the best for her as we wish it for friends whom we love." May all teachers in America take this sane attitude in performing their daily task!

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[4] Post, Louis F. Ethics of Democracy, p. 321.

Teaching the National Ideals—The great democratic ideals, the ideals upon which the American Republic was founded, should never be lost sight of in many schemes of teaching patriotism. Since the declaration of war practically every city school system heard from has instituted some means in arousing the patriotic feelings in children, such as flag cult, pageantry, national songs, etc. Take, for example, the flag. In some cities, the pledge to the flag has been insisted upon for all children. With elaborate ceremony the children are made to take the following oath: "I pledge allegiance to my flag and to the Republic for which it stands: One nation indivisible, with Liberty and Justice for all." In some other cities, children are made to salute the flag and repeat the pledge every morning when the school is in session with the deep solemnity appropriate to the occasion. These measures are excellent in themselves, but the meaning of the flag and the national ideals, traditions, and aspirations that the flag symbolizes, should never be overshadowed by the excitement of showy exhibition. Patriotism is an abstract term. The spiritual significance of national principles can not be intelligently appreciated without maturity of mind and openness of heart. Children of school age can not be expected to grasp the abstract principles without any tangible and visible form. Consequently flag salute is one of the means of teaching children what the country stands for. But it must always be a means, not an end. When it is conducted as an end in itself, then the flag becomes an object of fetish worship. This is quite obvious to every thinking person yet this is the very thing which we are likely to overlook.

Furthermore, in connection with the teaching of national ideals the duty of citizenship should also be emphasized. The ideals which the American flag symbolizes are most comprehensively stated in the first clause of the Declaration of Independence: "We hold these truths to be self-evident, that all men are created equal, that they are endowed by their Creator with certain unalienable rights, that among these are life, liberty and the pursuit of happiness." But every one of these rights has its correlative duty. The right to life imposes the duty to protect the life of others; the right to liberty requires obedience to law; and the right to happiness presupposes the obligation that the same right of others be not unlawfully interfered with. In other words, the right to citizenship enjoins the duty of serving the nation whenever the service is needed at whatever cost. In America the individualistic tendency has always been in ascendency. The rights of the individuals have been over-emphasized while the duty to the nation often suffers neglect. Sometimes even the laws of the country have been flagrantly violated by the unbridled passion of the mob. Take for example, the mob laws, the lynching of the negroes, etc. America is fighting for the cause of democracy, so it is the duty of the American people to see to it that democracy is safe within their own national boundary. In this time of national crisis we need a new spirit of patriotism. Strike when the iron is hot. Now is the high time for the teachers to bring home clearly and forcibly to children the duties of citizenship. They would perform a task of a very high order, if on those occasions of flag days, patriotic pageantries, etc., they would tell the children what they ought to do for the country instead of pronouncing eloquent eulogies on the nation's glory and success. In a recent publication the State Council of Defense of Connecticut has stated this principle very admirably in the following words: "This war is bound to have a deep influence on American life and thought, and we should be watchful to direct this into right channels. The country is shot through and through with the one-sided philosophy that the State is an institution to be leaned upon and filched from, but not to be served. The schools should train the children in the fundamental contact between citizen and State. The idea of mutuality should be developed. The State owes duties to the citizen, but the citizen owes reciprocal duties to the State."

Teaching War Aims—Too much emphasis can not be placed upon the teaching of the war aims of America by the public schools. American population is of a cosmopolitan character. Many school children are foreign born and still more are of foreign parentage. "The native land has its ties on the heartstrings of its people." It is no wonder that some children are often ignorant of the cause of America, and, being influenced by their parents, incline their sympathy towards their native land. Shortly after the United States entered the war, a teacher in one of the large New York City high schools, where most of the pupils come from the foreign section of the city, asked 200 pupils of from 14 to 18 years of age to write a brief statement concerning the cause for which America went into the war. The dominating tone of the answers was very disappointing. Some of the answers are as follows: "Congress has declared war so that the rich folks can get richer," and "We are at war, because this is a rich man's country."[5] This astonishing ignorance of the nation's motives indicates the great task which is before every one of the half million school teachers in this country. It is they upon whom America is relying to give the children some clear, definite information as to why America is fighting and what she is fighting for. If not they, who are the persons to do it?

Teaching the Ethical Values of Bravery and Self-sacrifice—Closely connected with the teaching of patriotism and war is the teaching of the ethical values of bravery and self-sacrifice. In this connection Prof. F. W. Foerster has quoted the following letter from the front describing the scene in a hospital:

"During the operation, which took place in a church arranged as a hospital, a bomb crashed through the church window above. Some of those assisting at the operation instinctively jumped aside, others disappeared under the operating table and others tried to save themselves by hasty flight into the sacristy or behind the altar. The shell-splinters and stones clattered through the church windows, and pieces of stained glass and of roof ornamentation rattled down on the reddish floor stones. 'Here we are operating!' said the surgeon unconcernedly; an energetic, 'Each one remains at his post' from the assistant quickly caused the people under the table and behind the altar to hurry forth. Calmly, as if we were in the operating room of a hospital, we worked ahead, looked for ducts, nerves, applied ligatures and sewed muscle after muscle to a useful stump. After the ligature the patient opened his eyes again soon, and murmured softly and contentedly, 'Ah, how well have I slept!' He would scarcely believe that he had already been operated on and that, in the meanwhile, almost the whole church had been destroyed. Astonished and amazed he looked at the ruined church windows. We laid him carefully on soft straw and while the hostile missiles thundering outside completed their work of destruction, he was already sleeping along toward recovery with deep, calm breathing."[6]

Another story told about the heroism of a British officer in the Western front is equally inspiring. During one fierce engagement a British officer saw a German officer impaled on the barbed wire, writhing in anguish. The fire was dreadful, yet he still hung there unscathed. At length the British officer could no longer stand the pathetic sight. He said quietly, "I can't bear to look at that poor chap any longer."

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[5] Dean, Arthur D. Our Schools in War-Time and After, p. 42.

[6] Foerster, F. W. New Educational Duties of Our Time. The Pedagogical Seminary, March, 1918, pp. 76-77.

So he went out under the hail of shell, released him, took him on his shoulders and carried him to the German trench. The firing ceased. Both sides watched the act with wonder. Then the commander in the German trench came forward; took from his own bosom the Iron Cross and pinned it on the breast of the British officer.

These are two of the many hundreds or thousands stories of heroism and sacrifice which teachers can utilize for moral instruction. The heroic defiance of death in the fulfillment of duty and in the rescue of even an enemy who was in distress, as illustrated by these stories, will sink deep into the minds of children in their most impressionable ages. The sterile, cut and dried verbal method of moral instruction can be much vitalized, if the teacher can only have the vision, ability, and interest to do so.

II. Training in Patriotism

So much for the teachings of patriotism. Valuable as they are, the war activities in the schools will have a greater effect upon the thoughts, feelings and emotions of children than mere verbal instruction. They give children a sense of reality in actually doing something for their country. They develop in children a feeling of pride and responsibility by the visible and tangible services rendered to a much larger object than the selfish ego. They tend to react upon the life of children in a quickened consciousness of personal and national ties, and a keener sense of common sacrifice and common duty. In other words, they furnish a kind of moral training based on the conception of patriotism which is dynamic, real and concrete.

In Germany, as far as information is available, we find many war activities of the school children deserving our unqualified commendation. One of the most interesting of all these activities which have been described is the collection of metals and cast away materials. In some places the school boys turned out in great numbers with bags, toy or larger wagons, botanical cases, and all conceivable receptacles in a house-to-house visitation on the street; sometimes the interest of the children was so intense and the enthusiasm so great that they would cry if refused. The parents had always been asked to consent in advance and never failed to do so. Very often the men and women visited have allowed them to search cellars, attics, sheds, outbuildings and even dump heaps, for every kind of tin can, iron hoops, scraps of copper or brass, and many other cast-out things of every description. Occasionally they formed themselves into teams and had one or two teachers with them on the expedition. Those visited were always glad to be relieved of refuse and often entered into the spirit of the children with great enthusiasm, going through the house from attic to cellar and giving up discarded things of considerable value. The boys entered into this work with intense fervor of competition, vieing with each other in the amount of things thus collected. When these were shown, the other children were usually stimulated to bring from their homes, or wherever obtainable, tiny things like buttons, penholders, etc., to enrich the school collection. What is the most important of all is that the children were always told with great detail by the teachers with regard to the uses of the things thus gathered and the stages of their transformation into war materials.

In England, although activities of the kind just mentioned have not been reported, yet the record of collections in money and of articles made in the schools for the troops at the front and in the training camps, for the hospitals, and for the prisoners of war in enemy countries is equally remarkable. From the report of the British Board of Education of 1915, we find a small village school in the north with 30 children on the roll collected in a short period 2,542 eggs for the wounded and made socks, mufflers, etc., in addition. In another east coast area the schools specialized for particular purposes, one sending parcels to prisoners of war, another knitting sailors' gloves, another providing clothing for refugees in France and Holland, another collecting and sending candles to a battalion in the trenches. A school in the same area showed its war fund, with a total of over 85 pounds raised by concerts, bazaars, and collections, and expended for a great variety of purposes. The enumeration of similar instances can be continued indefinitely.

Beside this collection of money and articles, work of a directly useful as well as of an educative kind has also been organized by the schools in connection with the manufacture of munitions or of hospital equipment. In a single secondary school in Breadford, more than 1,200 articles, including splints, crutches, bed-boards and rests, screens, rollers, trays, etc., have been made in the manual department during the school year of 1915. In another school in Midland county, hundreds of sand bags have been made by the children as well as a great variety of hospital requisites.

Works of this kind can be found everywhere. They are largely spontaneous in character, springing from the initiative of individual teachers or pupils themselves. They elude classification and cut across the formal divisions of curriculum. Yet who will doubt their educational value in the light of modern pedagogy?

In France, we find the same activities as we find in England. For instance, liberal subscriptions from pupils to the national funds, participation in the collection of gold, the dispatch of packets to soldiers, the donation of books to the children of reconquered Alsace, the help given to the orphans whom a school or class has taken under its charge,—these and many other activities represent the war work in the French public schools of to-day. As *The London Times* says in this connection, "The most detailed enumeration would hardly exhaust the activities of education in the common cause."

In Australia, we have the same story. Soon after the outbreak of the war, the "Young Workers' Patriotic Guild" was organized. The members of the guild pledged to do personal labor for the War Relief Fund. Any one who earns one pound by personal productive effort is rewarded with a certificate in colors signed by the Minister and the Director of Education. It was reported that thousands of these certificates had already been issued.

The most interesting feature of the guild is the kind of work in which the members engaged in winning the certificates. They have chopped wood, dug potatoes, milked cows; they have gathered bones, fat, bottles, wool from the fences and scrub, iron, kerosene-tins; they have snared and skinned rabbits, trapped foxes, caught fish, dug gardens, cleared tracks, done all kind of odd jobs at home; these and many other activities represent the kind of efforts the boys and girls have put forth in helping the nation in a great cause.

There are many stirring stories about the loyal services of the school children in raising the War Relief Fund, but only one may be mentioned here. In one school, in a very poor locality, a big lad took a job for the holidays. He earned ten shillings. When the school re-opened, he handed to his teacher all the money he had ever handled, tied up in a piece of rag. "I can't take it all, Jim," said the teacher, "give me half and keep the rest." "They want it more than me, sir," was the answer.

By way of introduction to this section I have cited a few examples of what has been done by the school children in foreign countries. Now we may turn our attention to the war activities in the schools in this country.

Junior Red Cross—One of the most significant movements in organizing school children for war service is the establishment of the Junior Department by the Red Cross. It has enabled the school children to take an official part in the educational work of the organization and served as an agency to coördinate all the civic and patriotic enterprises that claim the attention of the public school. When the Junior Red Cross movement was on foot last September, President Wilson issued a special proclamation to the children of the country. A portion of his message is as follows:

"Our Junior Red Cross will bring to you opportunities of service to your community and to other communities all over the world, and guide your service with high and religious ideals. It will teach you how to save in order that suffering children elsewhere may have the chance to live. It will teach you how to prepare some of the supplies which wounded soldiers and homeless families lack. It will send to you through the Red Cross bulletins the thrilling stories of relief and rescue. And, best of all, more perfectly than through any of your school lessons, you will learn by doing these kind things under your teachers' direction to be the future good citizens of this great country which we all love."

This appeal from the President has expressed the pedagogical significance of the movement and in a large measure made its phenomenal success possible. By January 1, 1918, the enrollment was 860,741 pupils, in 2,531 schools, under 563 chapter school committees. Following the drive for membership in February, 1918, the membership grew rapidly until at the time of this writing, there are over 8,000,000 pupils under more than 3,000 chapter school committees.

The exact records of the contributions made by the Junior members in the form of various hospital supplies and comforts for the troops are not available. But we can safely say that there is no school in the country which has not taken up Red Cross work in one form or another.

In Plainfield, N. J., the first school to become an auxiliary of the Junior Department of the Red Cross was a school for sub-normal children. So far as it is known, this school, which raised its own supply by a sale of articles made by the children, was the first public school in the country to organize on the national plan.

In ten of the grade schools of the same city, Red Cross work has been systematically organized. The children in the first and second grades are snipping for ambulance pillows and making light weight books from old magazines for hospital use. The third, fourth, and fifth grades are busy on wash clothes and squares for bed covers, etc. In grades sixth to eighth the activities center around knitting and surgical dressings.

The pupils in the high schools have been organized into six units, namely, knitting, surgical dressings, comfort kits, sewing, clerical work and wood work. And what is more important is that all the work has been so planned that it may be done outside of school hours.

In the State of New York, six weeks before the declaration of war by Congress letters were sent by the Commissioner of Education, John H. Finley, to school officials thoughout the State, authorizing the sewing classes to do work for the Red Cross as a part of the regular class-work. The response was immediate; and many schools had been at work and thousands of articles had been turned out long before the organization of the Junior Red Cross.

In Los Angeles, California, where the public schools have been most efficiently organized for war service, Red Cross work was made a part of the regular curriculum. For the purpose of avoiding confusion and duplication of efforts various persons were appointed by the superintendent to supervise the work. According to the regulation no principal or teacher can use the pupils for any work of the Red Cross without the approval of the Chairmen who are in charge of the work. It was claimed that under such organization it was possible for the teachers and pupils in the elementary and high schools to prepare a very large amount of products without sacrificing any educational value. A recent school report of that city shows that within seven months no less than $23,000 worth of articles for the use of soldiers and sailors was produced by the school children.

In addition to this enormous amount of products contributed, a temporary Red Cross toy shop was opened in the commercial district shortly before the Christmas holidays for the sole purpose of selling articles made in the schools. The goods displayed were toys made in the manual training shops, and products from the Art Departments in high schools and from the department of Domestic Science in high and elementary schools. After all the expenses for raw material, transportation, etc., had been paid, a cash balance of over $1,500 was turned over to the Red Cross. It is true that the cash contribution from the Red Cross toy shop was not very great, in comparison with the other war activities which Los Angeles schools have undertaken. But the educational values, in the creation of designs, and in the making and coloring of the various articles, are very great. In this connection the report on " Los Angeles City Schools and the War " says: (p. 25), "At no time had there been greater enthusiasm in the shops than during the second half of the semester when boys and girls were engaged in the making of things which so happily reflected their powers of invention and industry, and which, because they were actually to be sold, afforded such a genuine sense of reality."

The other interesting activity undertaken by the Junior Red Cross in Los Angeles is the salvage work. It began with the saving of tin foil. From this very humble beginning, the salvaging of innumerable articles was undertaken. The school children were organized to collect all kinds of waste materials, such as dental fillings, waste rubber, cigarette boxes, typewriter ribbon boxes and metal spools, worn-out tires, books, magazines and newspapers, collapsible paste and paint tubes, etc. At the beginning the returns from salvage netted about $50 per month, but the latest report shows that the Los Angeles Red Cross derives a monthly revenue of over $600 from this source alone.

The children who participated in the work have developed a very surprising market for their rubbish. They at once thought that the typewriter ribbon boxes and spools should be worth more than the old tin plate, and so they approached the office-supply houses with the proposition that these articles be used again. They met the dealers' objection by suggesting that a little sticker reading, " Salvaged by the Red Cross," be pasted on each box. The scheme has proved very successful. The demand for salvaged boxes on the part of business men became very great and the dealers paid a very good price for them. Los Angeles uses 30,000 typewriter ribbons in a month. One can easily imagine how much material can be saved in salvaging this kind of article alone, if it is made on a national scale!

These are only a few typical cases of what has been done in Junior Red Cross work. Taking the country as a whole, the amount of products turned out by this new organization must have been enormous in the first year of the war, and it will probably be increased by many fold as long as the war lasts. As an example of war work this is inspiring. It is, however, worthy of consideration whether or not these activities have any educational value with regard to the content and method of school instruction.

In the first place, the Junior Red Cross work offers to the children a practical knowledge in many things which the traditional type of instruction can not and does not provide. Up to the present it has been difficult to devise ways in which the classroom activities in manual training and sewing may afford the means of really teaching the boys and girls something which will be useful to them when they are thrown into the world on leaving school. The cost of the material and the lack of means in disposing of the products have led to an artificial kind of classroom work. We are familiar with the cry of some teachers of manual training that the making of coat hangers, model joints, and book racks does not satisfy the boy because he does not see the use of making them. They are in most cases used for the purpose of school exhibition and give no sense of reality nor pride of achievement to the maker. How very much more practical and useful will be the knowledge gained by making various kinds of hospital equipment for the Red Cross! Again, in the sewing classes the old types of instruction are still much in evidence. The pupils are usually made to labor over sample stitch cards, making a dozen long rows of various stitches, perhaps ten of which they will never have any use for. Then this is followed by making doll clothes. As the final stage of this sewing work the pupils may spend several months in making fancy graduation dresses. How much better would it be to give the girls a significant training in attaining speed and skill by making similar articles in large quantities for healing the wounds and relieving the sufferings inflicted by war? The Red Cross furnishes a justifiable outlet for the school products. It comes to the schools with a need of articles requiring no less technical instruction and skill than the ordinary classroom work. It gives children a genuine sense of practical utility of their daily labor.

In the second place, the Junior Red Cross gives children a concrete opportunity for service. Service is the watch word of the day. It has become the yard stick by which human character is measured. The chief value of the Junior Red Cross in education lies in the fact that it demands of its members service, a service that is given with sacrifice. It makes the children feel that they are not the negligible units of the country and that they too can serve very effectively in the times of national distress and need. It helps the boys and girls to forget their own selfish interests in an endeavor to work for others. If this is not the best kind of moral training, what better means can we have?

In the third place, the Red Cross study can be introduced as a part of the regular classroom work whenever the topic is being developed. Every kind of manual work has its cultural value, so has that of the Red Cross. In the public schools of Louisville, Kentucky, the study of the Red Cross organization has been carefully outlined for the regular instruction in the classroom. The outline covers a great variety of common school subjects, such as Industrial Geography, Descriptive Geography, History, Civics, English, Arithmetic, and Art, and shows that in every one of these subjects the study of the Red Cross organization and activity can be incorporated. Take for instance the Industrial Geography. The *Outline* suggests the following:

"1. Study of lumbering.
    A. The conservation of life in the lumber camp. A study of how the First Aid Department of the Red Cross co-operated with lumber companies and the Bureau of Forestry to introduce First Aid Instruction among the employees.
    B. Relief offered in times of forest fires, accidents, etc.

"2. Mining. The study to include:
    A. Instruction given to miners by the First Aid Department of the Red Cross.
        a. The extent and effectiveness of this instruction.
        b. The co-operation of the railroads in this work.
    B. Relief offered by the Red Cross in times of accidents, fires, explosions, etc.

"3. The rehabilitation by the Red Cross of places that have been destroyed by earthquake, floods, famine, fire, etc. For example,
    A. San Francisco.
        a. The disaster.
        b. The immediate relief.
        c. The permanent relief and rehabilitation.
    B. The Chinese Famine and Plague (1911-1912).
        a. Description and causes.
        b. Relief measures.
        c. The plans outlined by the Red Cross representative for preventing these floods.
    C. The Messina Earthquake.
        a. The disaster and general relief.
        b. Relief work at Syracuse; road making, shoemaking, etc."

Schools which are bound up with red tape and tradition, and school teachers who continue to teach history, geography and other school subjects in the same way as their grandfathers were taught, can have no sympathy with this Junior Red Cross movement, because it upsets the regular school program as the result of their inability to see things in a new light and to adapt their work to meet the new needs. But schools that are keeping pace with the modern trend of pedagogy will welcome this opportunity to vitalize their courses of instruction and curriculize such activities on the ground not only of patriotic service but also of pedagogical desideratum.

The Care of French Orphans—One of the most unique incidents of the war is the financial help given to the fatherless children of France by the school children in this country. The movement for raising the French War Orphan Fund was first started in Los Angeles and spread rapidly to other cities within the past few months. As early as June, 1917, an appeal was made by the Superintendent of Los Angeles to the teachers and pupils of the public schools to aid the fatherless children of France. This campaign aroused the greatest interest among children of all ages. Those who had money contributed very liberally to the cause. Those who had tender hearts but scanty means often denied themselves many things so that the unfortunate children in France might not go hungry. In one of the schools in that city, where the children bring a penny daily for milk, the children voluntarily went without their morning meal, then turned the pennies into the school fund designated for such relief purposes. It was estimated that $36.50 per year would save the life of one of these children of France. The total amount contributed by the Los Angeles schools up to the beginning of this year exceeded $20,000.

Besides this French War Orphan Fund, American boys and girls have begun in ever increasing numbers to adopt war-cousins, furnishing small monthly or annual amounts of money to enable the French widows to raise their children in their own homes. The war-orphan learns the name of his young American benefactor and keeps correspondence with him. Thus a bond of friendship is formed between them which will prove to be endurable and unbreakable.

In this particular kind of philanthropic work the Los Angeles schools have also done wonderfully well. Over a hundred of these children have been regularly adopted and the number has always been increasing. The most interesting features of these contributions were the letters sent by the benefactors to the little friends in need across the water. A few quotations may be made here.[7]

One girl writes: "It is not strange that as soon as you receive my letter we are going to be chums. I won't ever forget you, Jeanne, because I've already made up my mind what kind of a little girl you are. I would love to speak your language, Jeanne, my grandmother was French . . ."

Another girl writes: "I do not know you, but let us get acquainted with each other by writing often. I live in Highland Park, one of the suburbs of Los Angeles. It is a beautiful place, with its many flowers and delightful climate. In the distance are the mountains clothed in purple, nearer are the hills made green by the recent rains. The sunsets here are wonderful. I am sure you would become an ardent lover of nature as I am, if you lived in Southern California.

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[7] Los Angeles City Schools and the War. Bulletin No. 10, pp. 50-53.

"While we are not suffering from real want, we are denying ourselves to help feed the little French brothers and sisters of ours.

"I will close, wishing yourself and your comrades God's protection."

Another child writes: "I am writing to you to-day, June 29th, on the last day of school, thinking meanwhile that I do not know anything about you except that you are one of the five little French children who were adopted by the school. My teacher gave the names and addresses of the children and told us to write to one of them and I choose you. I am very sorry that you have had such a terrible war in your country and hope sincerely it will end soon. You have my deepest sympathy and not only mine, but I think I am safe in saying you have that of every boy, girl, man and woman in the United States.

"We are going to have a vacation two and a half months long and during that time I will think of you and I will wish that the war should be over and that you should be having good times also.

"My best two friends are sitting beside me writing to two other little French children. One of them, Juanita by name, is writing to your little brother so that you will receive both letters together. . . ."

Although this movement has not become nation-wide, a significant beginning has been made. The fact that many boys and girls in America are toiling and denying themselves to save the lives of many boys and girls in Europe will likely result in the creation of a new international spirit that will make the world a better, safer, and happier abiding place in the future. The world of to-day is to be the children's heritage. These heart-touching manifestations of true international brotherhood between the members of the coming generation are the most hopeful signs of a new international order which will forever make brutal warfare impossible.

Liberty Loan Drives—With regard to the various Liberty Loan drives the school children have in no small measure helped in making each one of them a success. From the reports at hand we actually find that millions of dollars were subscribed either by the pupils themselves or by persons solicited by them. No attempt shall be made to enumerate the various devices of the campaigns carried on by the school children, but the work done in this connection by the high schools in Detroit can not be left without mentioning.

Realizing the importance of enlisting the high school boys and girls of Detroit in the bond campaign, the Detroit Board of Commerce made, at the beginning of the second and third Liberty Loan drives, generous appropriations for the High School Committee. The Superintendent of schools, appreciating the value of services that would be rendered by the students and the benefits to be derived by them in an educational way, has authorized in each case all high school teachers of English to lay aside their regular work and make a study of conditions relating to the sale of bonds. Bulletins, which outlined the class activities and suggested the possible solutions to various problems, were prepared for the teachers and students. Numerous committees among the students were organized. Two-Minute Boys and Girls were selected. The weekly program of class activities during the period of the drive was systematically mapped out. The arts of salesmanship were carefully studied in the class room. And what is the most important of all is that a complete record of all the work done in the English classes was preserved by a collection of scrap-books and portfolios which contain materials of an intensely practical and patriotic nature ranging from salesmanship talks and sales letters to plans of reconstruction after the loans have been oversubscribed and final victory achieved. Each English class was required to present a scrap-book and a portfolio in an attractive and creditable form to the Head of the Department of English or to the Principal as evidence of the fact that it had continued its training in English and had accomplished other patriotic duties at the same time. The scrap-book contains newspaper and magazine clippings, circulars, posters, pamphlets, government documents, pictures, cartoons, advertisements, and a collection of stray odds and ends bearing the spirit of the campaign. The portfolio contains copies of patriotic speeches, selling talks, dialogues, detailed minutes of class programs, book reviews and digests of magazine articles, copies of advertisements and posters prepared by the class, sales letters, a final statement of the results accomplished, and comments upon the weakness that might be corrected in future campaigns. From among the scrap-books and portfolios presented by each of the grades in the high school, one of each will be selected for exhibiting in the public library or other places accessible to the public at large after the drive is over. The whole system is so unique in every respect that I have no doubt that the interesting documents thus preserved will have a very great historic value for the future. Schools which have done much in training the pupils for such patriotic service but have not made any provision for keeping the record of their work, should find such a system worthy of imitation.

War Savings Movement—This movement was first started in England. On May 5, 1916, the English Board of Education, at the request of the National War Savings Committee, issued a circular asking for the assistance of local education authorities in making known through the public schools the facilities for saving afforded by the issues of war savings certificates. With the co-operation of the authorities and teachers, special lessons were given on the subject and copies of a leaflet explaining the purpose of the war savings associations were widely distributed to parents through the children. As a result of the campaign a large number of war savings associations have been formed in direct connection with the schools, and hundreds of thousands of certificates were purchased by their members. The following are some typical instances of this movement as reported by the British Board of Education.

"In one large populous Midland County the great majority of the schools have established associations. Most of the village associations were started by the schools and have grown until they have gradually absorbed the village; one association thus formed in a remote village of 245 inhabitants has 77 members and has purchased 556 certificates. In another Northern County some 70 per cent of the schools are taking part and there are nearly 10,000 subscribers; 3,200 certificates have been bought. In a large County Borough in the Midlands, with 50 schools, an association has been formed in every school; a smaller Borough in the West of England has 20 schools and 18 associations. Some striking examples of the success of individual schools are reported. In one Midland town a school of about 1,400 children purchased certificates to the value of 585 pounds in three months, of which one was a holiday month. In another school of 500 scholars in a Northern town every child wrote a letter to his parents asking permission to join the School War Savings Association, and the response was so good that on the next morning when the first subscriptions were received no less a sum than 234 pounds and one shilling was brought by the children. One school with 400 children, in a Northern County, has subscribed 1,557 pounds and 1,500 war certificates have been bought. A remote little school in the same county, with only 10 children on its books, has 10 subscribers to the association, has saved 35 pounds, and bought 43 certificates."[8]

So much for England. Shortly after America's entrance into the war, a plan for two billion dollars of War Savings

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[8] Report of the British Board of Education, 1915-16.

Stamps was put into practice. From the answers to my questionnaire in this connection we find that members and officials of many school authorities, teachers and pupils have all entered into the thrift campaign with enthusiasm. In some cities the school savings banks have made special provisions to facilitate the purchase of War Savings Stamps by the children. In some others the principals and teachers are doing everything possible to encourage the children in this national undertaking. In still others, W. S. S. clubs have been organized among the pupils of some special classes. In other words, the public schools have responded very loyally to the appeal of the government in its endeavor of financing the war.

Now we may ask what is the significance of the movement from the educational point of view.

In the first place, such movement will serve as a great means for the inculcation of the principles of thrift among children. There can be no doubt in the minds of clear-thinking Americans as to the imperative necessity for thrift. America is the most prosperous nation in the world and is perhaps also ahead of all other nations in prodigality. Prosperity begets extravagance. Average people in America can earn money very easily. They are getting the highest wages in the world; they have had the best opportunity in the world to save. But unfortunately, they are inclined toward improvident living and do not spend their earnings with wisdom and prudence. According to a recent estimate the per capita savings in America are $50, while in Denmark and Norway the per capita savings are $70, in Switzerland $86, in Australia $91, and in New Zealand $98. It is quite apparent that the American people have not learned the lesson of thrift. The only way to remedy this condition is to teach thrift as a branch of public instruction. The schools must bear the responsibility of teaching the chilren not only how to earn, but also how to save and how to invest, and through children the public may also be enlightened.

Schools that have not taught thrift in an effective manner can now utilize this war savings movement to drill into the children the thrift principles on the grounds of pure patriotism. Tell them that those young men who have donned the khaki, or have taken service in the navy, or enlisted in the aviation corps have responded definitely and valiantly to the call of duty, so it is the obligation of those stay-at-homes to save for themselves and to serve the government in financing the war. Teachings of this kind do not rely upon precept but rather on daily practice backed by a lofty and noble motive. Once the habit of thrift is formed, it will become the "possessor's second nature" which can not easily be discarded.

In the second place, the war savings movement may mitigate the dangers of war with regard to the children's moral welfare. In England, the cases of juvenile delinquency have increased 34% in seventeen large towns investigated.[9] One of the chief reasons for this increase is due to the "high wages earned by the children with absence of adult direction as to their disposal." As a direct result of the war, boys and girls have been largely employed at excessive wages. This earning power has developed a pseudo-independence which shows its demoralizing effect in a great many ways. This is one of the social problems England is facing to-day. In America the increase of juvenile delinquency has not been much in evidence. But with the scarcity of labor, the employment of children, especially those of high school age, has given them an unprecedented opportunity to earn good wages. Since in childhood and youth instincts are strong and impelling for gratification, it is difficult for children to restrain themselves from yielding to attractive temptations on every hand, especially when they have plenty of money. The safest and surest way to safeguard their moral welfare is to create and foster in them a new interest and a new habit of thrift, so that they may invest what they have earned. The war savings plan seems to be a superb means for this purpose.

In the third place, the training in thrift through the purchase of war savings stamps has a moral as well as a social value. The individual power of self-reliance must have thrifty practices as a foundation. Children who know what to do with their earnings, and who have a little savings in the bank, will feel augmented self-respect, widened mental interest, more sense of responsibility, and greater power of self-denial. The pride of really having earned something and the feeling of ownership give them a wholesome sense of self-dependence, upon the cultivation of which modern pedagogy can not lay too great emphasis.

In conclusion, I may say that war has afforded a very great opportunity for direct moral instruction and training. Teachers who had felt that verbal instruction in ethics tends to be uninteresting and inefficacious can now base their teachings upon the broad conception of patriotism and personal sacrifice for country. But the task of the American school in these times is not to arouse in children vague emotions of a patriotic flavor, but to give them a new view of social and civic responsibility. The extraordinary demands of war service may in some slight degree disturb the ordinary school program, but such a disturbance may be a blessing in disguise. Every kind of school work may be motivated through the spirit of patriotism. Every kind of war service may augment the sense of loyalty and self-subordination in children. The educational benefit derived from the war activities may offset any real or fancied losses of school time. Will the public schools prove themselves equal to this new opportunity and new task?

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[9] The investigation was made by comparing the number of the juvenile court cases during the three months Dec. 1914 to Feb. 1915 with those during the three months Dec. 1915 to Feb. 1916. For detailed information, ,see: "The Child and the War." By Cecil Lesson, (P. S. King and Son, Ltd., Orchard House, Westminster, 1917, 70 p.)

SOME EDUCATIONAL VALUES OF WAR*

By G. Stanley Hall

This war is the most tremendously important event in all the history of man and we are just now very near the greatest crisis the world has ever seen. The war and its needs are the chief occupation of nearly a score of the leading nations of the world. Freedom vs. domination of some kind has been the stake of every war since the first tick of time, but in this colossal contest the issues of all previous wars are pooled. What happened in the world before 1914 already begins to seem a bit far off, unreal, and insignificant by comparison with the mighty fates that crowd the here and the now. We are making history, as it were, a century a month, and changes of sentiment and activity that once took a generation may now occur in a week. As Lincoln said this country could not remain half free and half slave, so we have decreed that the world cannot be half autocratic and half democratic, but must be all one or all the other. In the old era that closed four years ago how easy, selfish, thoughtless, careless, sometimes mean and sordid we were; but now men do every day deeds that equal or surpass the most splendid achievements of the heroes of old which our text-books praise. The divinest figure of the past suffered and gave His life freely for others (greater love hath no man than this, that a man lay down his life for his friends), but hundreds of thousands are dying for just that end in their way to-day.

We have praised unity and fraternity, but our people have been a congeries of a score of nationalities which had known little of the melting-pot; now the masses and classes, capital and labor, sects, parties, races, colors, are being bound together in camp and trench by the strongest of all human ties—that of brotherhood in arms, so that the nation is now achieving a new and higher unity. What is more and even better yet is the comradeship of our soldiers with those of all our allies, so that we are now one with the men of England, France and Italy by ties that no treaty or league of nations could ever effect, for it is the bond of a common cause, a common life, a common enemy, and perhaps a common grave, in that greatest cemetery of the world that stretches four hundred miles from Switzerland to the North Sea. Neither we nor they dreamed that these men in the third and golden decade of life from the farm, factory, the shop, the college, could become in a year so stalwart of body and of such heroic mode of soul, and as we realize what they have become and are doing and that their sentiments and ideals will dominate this country for the next generation, we feel satisfied and proud as well as safe.

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*Address delivered at the general session of the N. E. A., at Pittsburg, on the evening of July 4, 1918.

Oh, the splendor and glory of "the day" that has come to us Americans! We have our "place in the sun," for it is ours to save Europe and the world for democracy. From England we hear how men have forgotten whether their ancestors came over with William the Conqueror, or whether their mates are rich or poor, educated or ignorant; and so here we ask no longer whether men are descended from the Mayflower Puritans or the Cavaliers or are Sons of the Revolution, but only whether they have the one quality that alone makes man complete,—courage, and the temper that can risk life for something dearer and greater than the individual life Thus a new order of nobility and a better natural grading of man is at the door. A French peasant marched from the south to the north of France, and was so impressed by the beauty of the country and the glory of the cities of his native land, that he wrote that it would be a high privilege if he were counted worthy to die for so glorious a fatherland. Another vowed that he would keep himself pure and make himself as perfect as possible in body and in soul, in order that if he were called to make the supreme sacrifice his offering might be worthy. Another sent home a prayer-poem thanking the dear Lord that he lived in a time when a year was worth a millennium, and especially that he was able to be in this greatest and noblest of all wars, to die in which, if he had to, would shed lustre upon all his relatives. Of "soldiers three" who went over the top one, a Protestant, was fatally wounded at the barbed wire before the enemy's trench and called to one of his colleagues, a young Catholic priest, to creep out if he could and administer the last sacrament before he died. The priest went over the hell-strip and had just extended the crucifix over his friend when he, too, was shot. The third friend, a Jewish Rabbi, seeing the situation, crept to the dying man, seized the crucifix and gave the dying man absolution, the Jew absolving a Protestant Christian by a Catholic rite, illustrating thus the sympathy of religions or the unity of brotherhood that underlies them all in the great cause. The French collected thousands of these authentic incidents, these new *acta sanctorum,* and on these base their exhortation to fight now and regenerate France later gloriously, in such a way that none of these sacrifices shall be in vain, for never was there a cause so well worth suffering and dying for. The grandson of Renan, Psichari, shot at the head of his battery, left a story, one of the most popular of all in the French trenches, amplifying the tale of Jesus and the Roman Captain who asked that his son be healed and professed faith that it only needed the word at a distance to do it. Jesus, elsewhere reluctant to heal Gentiles, did so with remarking that nowhere in Israel had he found such faith, thus showing, we are told, that Jesus best of all knew the superior deference due to the true soldier.

Whatever was there in the past, in history or even in literature, that cannot be paralleled or surpassed in high moral quality or in significance in the events now current over there?

Now our every energy must focus on winning the war, putting out the fire in this world-conflagration; but as Chicago, Baltimore, San Francisco, and once London reduced to ashes had to be rebuilt afterwards, so when peace comes we shall have to enter upon the long and stupendous task of reconstructing our industrial, economic, social, political, hygienic, moral and even religious life and institutions. Things we have never dared to doubt are now open questions. Folkways we thought solid are now plastic, and we must revise, if not rebuild, a large part of the whole structure of our civilization and make nobler mansions for mansoul. It is a new cosmos that is about to be, and it is our tremendous task to use these opportunities and incentives in a way to make the world enough better than it was to pay for all this horrible sacrifice and to usher the rising generation into a new kingdom of man, just as at the present moment we must get all the virtues and abate all the evils of militarism and find out, not one, but many, moral equivalents of war.

In this situation, which is, most of it, beyond all precedent, what is the chief duty of every teacher in the land? It is, in a word, to utilize to its very uttermost, and at every possible point, the tremendous energy of interest and incidents to inundate our educational system at every grade and every topic with the very purest spirit, of loyalty, sacrifice, courage, hardihood, and of national and racial solidarity, which has its culmination in the metal of our heroes at the front. It is the boys and girls now in the school that will win or lose the great war after the war. The spirit of our boys over there is itself a splendid epistle known and read of all men of what the school, among other agencies, has done for them. The new method of grading the merits of our schools and school systems now is by what they are doing in all the complex processes of food production and conservation and in all other war modifications of school activities, in which our census shows enormous diversity of service in different states and cities. Some schools and individual teachers have shown something near to pedagogic genius in using war interests in the teaching of geography, not only keeping tab on all the battle lines on all fronts, but upon every center of military and naval, and even administrative activity in the west or the east. Some teachers of history have achieved remarkable results in turning on the war zest, realizing that history is now being made at a vastly more rapid rate than ever before and that present happenings are more significant for their pupils than all the events of the remote past, so that the right and adequate teaching of current events now can educate in a sense that all the rest of the curriculum combined cannot do. Other schools start war museums, encourage war diaries, correspondence, compositions, debates, war scrap books and even poems. Germany announces that her school boys and girls have written between two and three millions of war poems, the best of which are rewarded by prizes and printing, for she recognizes that poetry is the vernacular of the heart, that the heart makes disposition and is three-fourths of the soul. Several of our states and more cities have organized junior military training in high schools, and some have real rifle practice like military manoeuvers; some hold that all-round physical training is the best fore-school for military training, while still others hold that modified Boy Scout activities are best to develop military qualities in the teens, although we must admit that all these lack something of the spirit of rigid discipline, subordination and splendid *esprit de corps* which actual soldiering gives and which heaven knows our callow, shambling American adolescents need, especially now when so many fathers are called away, so that boys are growing wild and slightly criminal, for want of a touch of the real military spirit which has a unique power that physical culture never can attain to make men out of hobble-de-hoys. The more work the schools can do in selling Liberty bonds, thrift stamps, doing Red Cross work, singing and hearing the best camp songs, gathering posters, slogans, reading up about the Kaiser and his six sons, who, if Germany wins will sit on six thrones, the Hohenzollerns being the ablest and perhaps the most consummate egoists among all the ruling families since the Caesars—the better. The more countless activities born of the present emergency, the better. Concessions as to high requirements for graduation and promotions in school and college are amply justified in the minds of all who realize the larger education that comes when the life of the community, the country, and the world, flows over into and irrigates the school so that it can teach life as never before. We must make no concessions to the narrow jingoism that would abandon now the study of the German language and history. German pedagogues, unique in their hatred of everything English, agree that this language and literature must now be studied as never before, and the same is true here, for whatever the issues of the war, German will be needed as never before for practical if not for cultural purposes.

The war is even more transforming colleges and universities. Chemistry gives special courses and promotes research on explosives and gas warfare, perhaps to be the warfare of the future; physics tends to focus on electricity, projectiles and the principles that underlie the mechanism of aeroplanes and submarines. Biology emphasizes eugenics and hygiene. Geologists help lay out trenches. History is more military and diplomatic and has a new interest in international law. Sociology and economics are absorbed in the reconstructions of all our industrial and social institutions that impend. Theology, law, and, most of all, medicine, are more practical, for everywhere the pure is yielding the saddle to applied science, while some academic departments are being neglected as if the students felt that they might be condemned as unessential industries. We cannot check or very much direct these trends, and they will increase every month the war lasts. It is simply common sense to accept and make the very most and best of them.

Finally, the future is our Muse. She is now invested with a promise and potency unsurpassed in any prophetic age. "Our hearts, our hopes, our prayers, our tears, our faith triumphant o'er our fears, are all with Her." The best things have not happened yet and all history so far is only the prelude to the All Hail Hereafter. In these times it is indeed bliss to be alive, to be young is heaven, old men are seeing visions and young men dreaming dreams, because if all this awful sacrifice and slaughter is not to be in vain there must emerge a new world wherein liberty and justice for every man, woman and child will prevail, wherein right, and not might, rules, where Kaiserism in every form, even that of trusts, monopolies, profiteering and the political boss, a superstate and the superman, dogma, autocracy, and militarism, shall be done away and the true kingdom of mansoul shall be made safe by defeating German militarism and kept safe on one or another of the great plans, British, French, or, perhaps better, an American plan for a league of nations.

A GENERAL SURVEY OF CHILD STUDY*

By G. Stanley Hall

Twenty-five years ago child study was in its lush and lusty childhood. Besides the older European writers, Lazarus, Ploss, Preyer, Perez, and others, American students, preceded by Bowditch and Porter, had begun their work. Earle Barnes had shown what the questionnaire can do. Miss Shinn was making her epochful studies of an individual child. Baldwin was construing geneticism philosophically. E. H. Russell had his unique method of spontaneous observations and was teaching psychology in normal schools with these data as texts. Chrisman had but lately given us the term paidology. Chamberlain was studying the savage child and there were already many monographs, topical syllabi, child study organizations and even journals. The questionnaire, a method borrowed from the anthropologists, was everywhere and called for information on every subject. As I look over the library I have been accumulating for years upon this theme I am amazed at the range of topics, some two-score papers on children's vocabulary, language and even "slanguage," more than a score on growth in height and weight, often specializing on growth of different parts and functions. On hygiene there are papers without number. We tried, too, in this way to study all the different feelings, sentiments, and emotions, laughing, crying, fear, anger, pity, and the sense of self, love of many kinds, religion, the child's feeling toward the blue sky, stars, clouds, sun, moon, storms and lightning, wind, fire, stones, trees, flowers, animals, and certain special types of animal life, to find the germs of totemism. There have been a score of biographical studies of an author's own childhood, from Howell and Warner all the way to "Una Mary" and Mary MacLane; and biographies as well as autobiographies have been much more prone of late to stress the early years of life. Then we have a copious literature on play which has resulted in the significant playground movement, many a study of special games and even puzzles, dolls and toys, general and special, quite a literature on creeping, walking and running away, others on certain nascent periods represented by the acme of teething, puberty and adolescence, and now precious data about physiological and mental age, while even the age of the teacher has been under investigation. The development of the function of each sense, of motor abilities, as represented, e. g., in drawing, have been less investigated, and we have very suggestive papers on such topics as twins, geniuses, freaks, even dwarfs and monsters. The study of not only normal but abnormal children has been extensively pursued so that we now have a pretty good knowledge not only of the adult criminal, thanks to Lombroso and his school, but of juvenile and infantile criminals extending even to early proclivities to special types of crime, a work that has evolved into the juvenile court and the social work connected therewith. More fruitful than the studies of delinquents have been the studies of retarded children, especially since the Binet-Simon tests came into vogue, so that, as everyone knows, we can talk with some definiteness now of psychological age, and in this domain we have a sheaf not only of special studies that add to our knowledge, but of practical methods.

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* Address delivered at Pittsburgh, July 4, 1918, in commemoration of the 25th anniversary of the Child Study Department of the N. E. A.

Here, too, opens the great field of eugenics and the study of abnormal and gifted families with a line of investigation now, thanks to Carnegie, represented by a valuable institution at Cold Spring Harbor. Studies in this domain have shed a very precious light upon the whole topic of heredity, and are slowly laying the foundations for improvement in our mating practices, if man can ever learn wisdom from science in a field where instinct has so long ruled.

The study of childhood has often been called a Copernican revolution since before it the child was adjusted to the school, whereas now everything in the entire educational system is conditioned by the nature and needs of the child. This we are seeing now in a most striking way in the careful elaboration of scales, standards and tests of proficiency in the different school topics, so that we have a pretty exact knowledge of the proficiency a child of average ability and opportunity should have attained in each branch at any school grade. In this practical country where knowledge is so prone to be put to work, we have, according to the Smith classification, now over one hundred types of child welfare organizations so that if there be any truth in the accusation sometimes made that in a country where there are a million childless homes, we have been in danger of losing close and sympathetic touch with childhood, we are at any rate trying to atone for this defect by the method of conscious compensation.

We have published various studies upon children's spontaneous organizations, but it was in England, which has done less in this field, that one of the best of these, the Boy

Scout movement, had its inception; while it was France, where somewhat more has been done, that gave us the Binet-Simon scale, ingenious modifications of which the Yerkes Committee is now applying so effectively in our army camps. There is some propriety, too, in claiming the efficiency movement, especially as represented in the corporation schools, as a congener of paidology, for here we have special, if as yet somewhat intuitive and not yet methodized, methods of selecting everywhere the best man for each job as well as eliminating useless movements and wasted energy in doing it.

For a decade or two this country led the world in the special studies of childhood. With the work of Stern, Meumann, and others, Germany took it up and has made contributions of very great value, not only improving upon our technique but adding to our methodology in some points. It would be fatuous to attempt even an outline, still less to give any proportions and evaluation of this great movement. We have a few excellent outlined texts with bibliographies, Luckey being the latest and therefore, as it should be, the best, but when the whole story of this great movement is written in full it will be found to represent a valuable renaissance of humanism, for until the war came we were likely to have more and more cause, with Ellen Key, to call this the century of the child.

Child study seeks to trace human nature to its beginnings, to detect and mold character in the gristle. It is therefore inseparably allied with evolution and, more specifically and in general, with the study of the childhood of the race and of primitive man in particular. Indeed, paidology ought to be considered henceforth as a most important department of the vast field of the study of man or anthropology. It marks the advent of a humanistic wave into our educational system, that was in danger of becoming mechanical in a sense that was more or less inimical to the life and spontaneity which all great educators have supremely stressed. We had, to be sure, the arid Herbartian formulae praising interest, but it is child study that has taught us that interest is the very muse, we might say, the Holy Ghost, of the school, without which all its work is deadening rather than vivifying. Interest is the first manifestation of any and every kind of ability, and it is almost a sin not entirely unlike rape itself to force knowledge upon reluctant or indifferent minds, because such unwilling knowledge becomes a burden and reduces rather than gives power, while teaching to souls already eager for it is a function akin to that of procreation. It is, as Plato first conceived it, no less sacred than the consummate office of true love.

But I turn from these more familiar fields to indicate also only roughly and inadequately, as the most notable of all contributions to paidology, those that have come to us from the psychoanalysts. Here we have studies of perhaps two-score eminent men and women which show how the chief influences that shaped their characters and their careers originated in the infantile years, and added to this we have what has been estimated at nearly two-score thousand clinical studies that show that it is to these years that we must chiefly look for the sources of all mental and moral abnormalities. It is preëminently thus during the first four years of life that all the fundamental traits of character and disposition or diathesis are formed. These very rarely change after the age of three or four. These are just the years that the adult forgets, but the character of life-interests, the intensity and direction of their momentum, are already established. The infantile in us is the unconscious, and the unconscious includes most of what we call instincts, feelings, sentiments, emotions, or, in popular language, the heart, out of which are the issues of life. The studies of childhood in this field thus take us down to deeper strata of human nature than the plummet of any previous psychology has sounded. The child is vastly older than the adult, not only in the fact that its traits precede those of adulthood, which is a far later acquisition, but the mainspring of every disturbance of sanity or virtue is also found in this first quadrennium of life. Moreover, all through life we live on a very slippery genetic scale and easily slide back or relapse into infantile states if fatigue, disappointment or disease befall us. All the delusions of all insanities, all our dreams, are made on the same pattern as our habitual dream-types, and these are the warp and woof out of which the day-dreams, reveries and wishes of childhood, which fancy can so often almost make come true, are made.

Thus the theoretical and the practical in this new line of paidology are closely knit together, and we have here at last found a number of fundamental mechanisms which go distinctly beyond the old doctrine of the four temperaments, a field where psychology had made almost no progress all the way from Hippocrates to Wundt. I have time to-day to glance only briefly at a very few of these traits.

(1) Perhaps there is no single antithesis that has been more often stressed of late, and that by men of every ilk, than that between the active and the passive. Nietzsche, James, Freud, Jung and many others have noted the contrast between the active, positive, aggressive man and the passive, receptive type, and to this pair of qualities each has given his own technical terms. The distinction does not, save in a general way, coincide with that between male and female.

Some children are born leaders and others no less born to follow. The actives are more prone to anger, the passives to fear. The one prefers to do things, the other to know things. One transforms the physical, social environment to fit his will, while the other may have a genius for adaptation and adjustment. The one wills, the other knows. In their pathological extremes the actives may be cruel and inflict torture, while the passives sometimes actually crave to be made to suffer or to be victims. It is interesting and important here to note that these studies have given us a radically new conception of both fear and anger. We have judged anger from its unfavorable outcrops, irritability, oaths, bestial rage, etc.; but in fact we now know that these are only the by-products or rather the abortions of human life-energy, so that what we have been prone to condemn is in fact the very most precious material of life; it is the essential push-up that makes the evolutionary nisus which impels everything young on to maturity, that subjects nature to man's control. In fact it is the ultimate principle of human energy, man-power, physical or moral.

So, too, the opposite impulse of fear has been another of the great well-springs of life. Man's fear of shock made science, which is prevision. His fear of disease created medicine, health, insurance, hygiene. His fear of extinction and death made the immortalities; while all knowledge and receptive processes, and in general plasticity to the environment, represent man's power of adjustment or *Einstellung*. This great distinction is as much marred by calling the one extreme Sadistic and the other Masochistic, as it would be to call the active type of character carnivorous and the passive herbivorous, as Bryant and Goldthwait do.

(2) Another trait of the utmost consequence to all later life, and the foundations of which must be laid in the first three or four years of life, may be dubbed erethism. Some have marked power, which others lack, to draw upon reserve energies in emergencies; and we all have experienced the phenomena of second breath and have heard boys warn their mates not to make them mad lest they become dangerous and uncontrollable. It is only another aspect of the same diathesis that often brings the mental reinforcement and exaltation that poets call the afflatus of a muse, religious inspiration by the spirit, etc. The psychological war studies to-day abound in records of young soldiers from the office who had little physique and who were easily fatigued, but in great emergencies seemed somehow to be able to tap reservoirs of energy that their more stalwart brothers in arms could not

do, and when the latter were all in would go on and perform prodigies of physical and moral heroism which surprised themselves. It is of course invaluable for each of us to be able to draw at need upon a great power not ourselves but which is thus placed at our disposal, and what is this power? It is simply that of the race which underlies the individual. Our conscious personality is based on what we have experienced in our own individual lives, but that is only a shallow surface current and far beneath that is the deeper tide that has always swept the race onward toward its goal. The power to meet unusual emergencies adequately and well, by drawing upon the capital hoarded up by our ancestors in us, is one of the chief desiderata of life, and we know now much of the regimen which adds or detracts from this power which has its nascent period in infancy.

(3) Somewhat related to the above is the distinction between the egoist and the altruist. There are those who all through their lives tingle with self-consciousness, are self-centered, prone to selfishness in all its ethical senses and in whom Spencer says individuation has been overdone. The hypertrophy of this trend of human nature makes that modern monster, the superman, who deliberately resolves to have, do, get, be, everything possible regardless of the means thereto. On the other hand, we have those who recognize that man is predominantly gregarious, a socius, that the individual ought to be only a cell in the body politic, a bee in the hive, every activity of which is in the service of the hive as much as if the bee were only a cell in an organism. Self-abnegation, sacrifice and even self-immolation may be a passion of this type. They instinctively prefer not their own but others' happiness and welfare. It is their chief delight to serve, to minimize, efface and even evacuate themselves. This type can really love other persons or die for causes greater than themselves, while the opposite type can never love or serve anything but self. The egoist is sometimes like the foppish Narcissus adoring his own beauty mirrored in the spring, or he may become a criminal largely because he lacks natural pity or sympathy, and so cannot feel the rights or the sufferings of others. In Christianity these types are set forth in their extremest form in the antithesis between the conceptions of Satan, the monster of selfishness, and Christ, the paragon of self-sacrifice.

(4) In the first triennium or quadrennium of life the fundamental attitude of the individual toward authority is pretty well established. The father is the child's first object of awe and reference. He apes, would be like, his father,

but nevertheless sometimes has to submit to his father's will, perhaps even to his chastisement. So love and respect may alternate with resentment, and obedience with revolt. Now the father for the child is the modulus or pattern on which are fashioned the child's attitude toward great men, the community, the state, the church, or perhaps God himself, whom he must always both love and fear. On the one hand, we have those who develop morbid symptoms at every suggestion of control, constraint, command. They are negativists or what are called kurophobes, to whom any suggestion of compulsion seems an infraction of their own sacred and inalienable liberty to do anything they please. Law and order irk them. They are born rebels, incorrigibles, anarchists, perhaps become conscientious objectors against military service or tax paying. To conform or sometimes even find that other people agree with them makes them unhappy because they wish to be utterly unique. Now all these attitudes,—political, social, religious, economic,—which determine whether men can do team-work or must always play a lone hand, are predetermined by the infantile attitude toward the father; and not only that, but we are told that all happy marriages are those in which, albeit quite unconsciously, the boy weds a younger replica of his mother, and the girl of her father, so that parents are setting patterns for future life-partners. Now some men ought to be rebels, to attack existing order, to be pioneers, to break out new ways for mankind in the way of discovery and research, and this general law is only a large expression of the fact that there comes a time when every child has to break away from parental control and set up for himself. This is all prefigured in the oscillations between the attitude of submission to the father and revolt against his will in the early years of life, for this predetermines our later attitude to all authority.

(5) Very interesting and important, too, is the principle of compensation. If one hand or arm is weak the other may be excessively cultivated, as in the case of the Kaiser, whose fine right hand and arm compensate for his withered left in a way that impels him to speak so much of the mailed fist, which is a modern translation of the hammer of Thor. The blind compensate for the loss of sight by the over-developing of touch. Demosthenes stammered, but, by the use of pebbles on the shore, more than overcame this handicap. Beethoven suffered from deafness. Very tall boys are prone to stoop, little men to strut and perhaps cultivate heavy voices and the mannerisms of great leaders. Ugly men and women have a stimulus to compensate, as Socrates did, by developing intel-

lectual charms. Now every child loves to draw attention to itself and to be served. It may in very early life become a little tyrant, so that it may have a sense of almost absolute power. On the other hand, it also has a sense of its weakness and smallness. It has a sense of its own inferiority and limitations. It is small, weak, and one of the chief stimuli in the lives of all of us is to conceal or make good for certain defects of which we are aware. We thus instinctively pad our minds and our characters as well as our bodies. Wherever we are born a little short we invoke culture to help us make good the deficiency. If man lacked a sense of imperfection and did not at the same time strive for perfection he would be without one of the mainsprings of everything that is good in the world. So, too, the principle of compensation is seen in diseases. It is only when the heart, stomach, lungs and nerves, are more or less disordered that we become conscious of them. Thus we reach the stupendous generalization, so rich in theoretical and practical consequences, that consciousness itself is remedial, that it is a form of compensation for arrest, defect, or perversion, and we have here another apparition of the universal "push-up," *élan vital,* the libido, or horme, or will to live, some manifestation of which all these names, that are all various terms for the underlying impulse of development which is far more active in these infant years than later, express.

(6) More difficult, perhaps, than to avoid arrest is the maintenance of psychic unity. The soul, as genetic psychology conceives it, is a congeries of very different and often diametrically opposite activities. We have first the great contrast between states of pleasure and those of pain, each of which has a mental horizon of its own. When we are elated we think and feel and will differently from what we do when depressed. Feelings especially go in pairs. Fear that flies stands over against anger that fights; love may pass over to its countervalent opposite, hate. Instead of pity there may be cruelty. Thus there is constant need of synthesis, and feeble, degenerate or exhausted souls may even be split into multiple personalities when associative bonds that knit up the different and contrasted factors are weakened or lost. Thus one function of education is to so organize the soul that all its powers can be brought to bear together and that there shall be no dissociated functions that work in isolation disrupted from the whole. The very complexity of modern life, with its innumerable specialties and interests, aided by the commingling of different racial stirps, makes compactness and harmony of all parts more difficult. Man has always in-

stinctively felt the need of tempering childhood and youth by experience of very intense emotions and in infancy the soul is all emotion. The French psychologist, Taine, insisted that sanity was only balance between different opposite insanities, and we know to-day that impulses and their inhibitions make up a large portion of human experience. Now it is in the first years of life that the ego spheres itself into individuality, and mature life is little more than an amplification of the impulses of tender years.

Thus, in fine, I have touched upon only six of the score or two of psychic mechanisms which have been definitized by this new line of psychogenetic study, which has made contribution to our knowledge of early childhood at once so precious and practical that it can no longer be ignored. Of course there are many themes of the old child study which are unaffected by the new, and of course, too, there is always grave danger of inferring from the abnormal to normal. But the chief handicap which has prevented the just evaluation of psychoanalysis and made the very name of its most important originator a term of reproach, has been the unfortunate fact that his own investigations have been so closely bound up with sex, which to some of his older disciples in this country became almost an obsession. Now, thanks to the younger generations of analysts, led by Adler and Jung, the whole scope of psychoanalysis has been broadened and its method shown to apply to all affective factors in psychic life, so that it can be taught and studied without offense to the moral instincts and with tremendous gain to mental effectiveness and sanification. These thousands of pathological cases which gave the material for this new departure in paidology are only magnifications of normal traits that are found in all. I entirely agree with Stern that nothing could be worse than systematically to psychoanalyze normal children, but, on the other hand, a touch of it in time, where there is insight to see its need, might have saved many of us, and may now save the children of the future, tedious detours, risks and arrests in their development.

From no other standpoint has it been so clear that in the study of childhood is the key to all our knowledge of human nature. To understand the psychic life of the child is first of all to understand all the deeper springs of activity in adult life, even those that make men and women great or make them criminal or insane, for here human nature is laid bare to its roots. Again, the child is the key to the study of primitive man and savages. Much of the most important literature in the whole field of genetics in recent years has consisted in pointing out the childish traits in savages and the savage traits in children. Even our forebears who dwelt in caves lived their lives, were wise or foolish, good or bad, sound or unsound in soul according to these rubrics. Indeed, even the higher animals in their fundamental instinctive activities can be thus better understood. In this field, too, are to be found the very best psychological explanations of war, its causes and the basal impulses that it unleashes. In fine, the more clearly we see that the unconscious or racial factors of the human soul are older, vaster, stronger than the conscious, just to that degree do we realize that the psychology of the future is to be genetic; for the best definition possible of anything in the world to-day is a plain description of the stages by which it has been evolved. Very many movements have already sprung from the recognition that the soul itself, no less than the body, has been genetically evolved, and for myself I have no doubt that the achievements that have so broadened and enriched the field of child study during the last 25 years since it was recognized by this Association, will at the end of another quarter century be indefinitely broadened. It is still morning, not evening.

Finally, in all these ways the student of child life to-day faces the most fundamental problems of human nature and character. Genetic psychology has well been called the psychology of depth rather than of surface. It deals with factors below consciousness, many of which in fact are too great to get into the narrow field of consciousness. It is just these well-springs of life-and mainsprings of conduct that war lays bare, for it takes us back to first principles. Its reversions bring men hard up against the stern problems of food, drink, warmth, physical comfort. Our splendid heroes in the trenches have consented to regress to the condition of the primitive cave-man and far worse. They experience the most intense of all emotions; they are exposed to mortal fear which may deepen into panic; courage enables them daily to look death in its most ghastly form squarely in the face. In the hand-to-hand conflict there is anger and rage, and they may at any hour have to ring up their very bottom reserves of energy or endurance. They oscillate from the extremes of most trying passivity under fire in the trenches to the mad impetuosity of the charge. The individual is swallowed up in the group, for the psychology of the crowd is all instinct, feelings, and emotion. The soldier compensates for the awful reality of war, too, by taking flight from it into song, jest, manifold recreations and games, reveries of home and loved ones. He packs up his troubles, smiles and "carries on," and all because he is perfecting his manhood by regressing to the regenerating well-springs of childhood, and in so doing finds a new heart and merges his life with that of the larger whole, as the bee lives only for the hive; and the best thing about war, and the only thing that can offset its evils and horrors, is the regeneration that its regressions may bring.

Thus to-day we are realizing anew that everything that is great, noble, generous, beautiful, true, has not only its inception but its purest and most elemental form in eugenic, eupeptic, euthenic, childhood. Its impulses and inspirations are the supreme impulsion, the most authentic voice of God in the world to-day. Jesus himself said and did nothing better than when he called children to him, set a child in their midst and said children always behold the Father's face, and threatened with a millstone in the sea all that gave them real offence, and would have all his followers become as children, to know and love whom keeps us teachers young, however old in years, for true, deep sympathy with essential childhood is likely to be more and more the chief qualification of the teacher. We may well rejoice to-day that it is our great good fortune to live in a period of renaissance of the naïve and the unconscious such as the world has never seen, in which, beside other great manifestations of this trend, childhood is more loved, studied, served, than it ever was in the world before. It is precisely this work that places in our fortunate hands the golden pass-key to every room in the splendid mansion of Mansoul.

GIRLS' COLLECTIONS

E. Leigh Mudge, Washburn College

The collecting instinct in boys has been frequently discussed. The contents of a boy's pockets, and the assortment of things, valuable only to the boy mind, which one may find in the room of any healthy boy, have occasioned much half-disgusted wonder in older people. That the collections made by girls are equally varied and characteristic, and, in fact, that the collecting instinct is as strong in girls as in boys, seems demonstrated in the lists of collections recently secured by the writer from thirty-four young women in a class in educational psychology.

Childhood Collections

The following objects are reported as having been collected in childhood alone. The number of instances in which the report is repeated is indicated by numbers in parenthesis. Those with no number following occur only once.

Small stones (7), Beads (3), Broken pieces of dishes (2), Scraps of colored paper (2), Doll clothes, Colored crayons, Bugs and butterflies, Rubber balls, Cigar wrappers, Pocket books, Cloth for doll clothes, Tumbleweeds, Buttons, Lightning bugs, Jewelry, Birds' nests, Birds' eggs, Locust skins, Shells.

Child Collections Continuing Into Adolescence

Many collections begun in childhood continue into adolescence, many up to 14 or 15, and a considerable number up to 17 or even up to the present college years. The following are of this class:

Paper dolls (17); period ending, on average, at 13, but some continuing to 16 or 17; Dolls (8), ending about 12 or 13, on the average; Books (9); Usually beginning in adolescence, but in a few instances before; Pictures (9); Mostly in adolescence; Post cards (9); Chiefly in childhood; Pennants (5), Pressed flowers and leaves (5), Colored silk or cloth samples (4); Chiefly in childhood; Stamps (4); Chiefly in childhood; Pets (3), Cats (2); Ending in early adolescence. One adds: "I hate 'em now;" Scrap book pictures (2), Valentines (2), Ribbons (2); Chiefly in childhood; Coins, Crochet patterns.

Adolescent Collections

These include collections begun in early adolescence, most of which have continued until now, and also those reported as being made now, without reference to the time they were begun.

Kodak pictures (11), Letters (7), Poems (6), Newspaper clippings (5): Several collections begun about 12; Dance programs(5), Music (5), Invitations, programs, etc., (3), Military souvenirs (2),Recipes (2), Magazines (2), Candy boxes (2), Rare coins, Balls, Ancedotes, Bread labels (At 16), Flowers, Old furniture, Magazine pictures, Jokes and games (12 to 15), Souvenir spoons, "Buffalo" nickels, Theater pictures, French souvenirs, Feathers from different kinds of birds (At 15), Old song books, Pennies, Bracelets (At 19).

BOOK REVIEWS

An investigation of certain abilities fundamental to the study of Geometry. By John Harrison Minnick (Doctor's dissertation, University of Pennsylvania), Lancaster, Pa., 1918, 108 p.

This is an exposition of the results of a comparison of marks given by the author to the answers to 5 sets of test questions in elementary geometry (first two books) by 5195 pupils in 63 schools in 10 states with the final school grades of those pupils.

The author states the object of his investigation thus: "Success in the formal demonstration of a theorem of geometry is dependent upon at least four abilities; namely,

1. The ability to draw a figure for the theorem,
2. The ability to state concretely and accurately the hypothesis and conclusion of the theorem,
3. The ability to recall additional facts about a figure when one or more facts are given, and
4. The ability to select from the available facts those that are necessary for a proof and to arrange them so as to arrive at the desired conclusion.

The purpose of this investigation is threefold:

1. To determine the relation of each of these four abilities to the teacher's marks. This should, in turn, determine either the extent to which the teachers value these abilities or the degree to which they are able to base their remarks on the things which they do value.
2. To determine the extent to which these abilities are developed in our high schools.
3. To develop tests which may be used for the purpose of diagnosis; that is for the purpose of determining whether or not the weakness of a class are due to the lack of development of one or more of these abilities."

Four tests (A, B, C and D) were developed, one for each of the abilities stated, and a fifth test (F) was added to supplement those testing abilities 3 and 4.

"Two scores were kept for each pupil. The one, to be known as the *positive* score, is based on the per cent. of necessary statements correctly given; and the other, to be known as the *negative* score, is the total number of incorrect and unnecessary statements in his papers." These two scores were kept separately. In making up the positive scores each exercise of each test is weighted on the assumption that an exercise for which the average pupil receives a mark of more than 50 on a scale of 100 is too easy by just that excess and should have proportionally less weight, and that an exercise for which the average pupil receives a mark of less than 50 on a scale of 100 should have a greater weight proportional to the difficulty indicated by the defect. Of course, the effect of this kind of weighting is to lower the score of the poor pupil and raise that of the good one.

The coefficient of correlation between the test and school grades has been computed for each school tested. Concerning the result of this comparison, the author makes the following remarks. "If the abilities which this study investigates are of value in themselves, or if they form the basis for other results which are of value, they should bear a closer relation to the school grades than these coefficients indicate. If, on the other hand, the coefficients of correlation can be taken as indices of the values of these abilities, then these values are so slight that the schools are scarcely justified in giving as much time to this phase of geometry as is now given to it." "If the abilities tested are essential to success in the study of geometry, then the results indicate that progress in some schools is almost impossible until these abilities have been further developed. On the other hand the achievements of other schools indicate that it is altogether possible to develop these abilities to a fair degree during the study of the first two books of geometry."

The author gives the several exercises of each test, instructions to the examiners, the methods of scoring the papers, the number of points assigned to each part of each exercise, the various proofs found in the papers in test D, a detailed account of his method of weighting the exercises, and formulae for the coefficients of correlation.

The greater part of the paper is devoted to tables and diagrams showing the results of the investigation. These include diagrams showing the distribution of the pupils given by the positive and negative scores of the several tests, their distribution as given by all the tests collectively, and the distribution of the pupils in several schools separately (showing how much the schools differ from each other). The tables include tables of coefficients of correlation for the several tests, average positive and negative scores for each exercise, and the number of pupils receiving each positive and each negative score for each exercise.

Clark University. WILLIAM E. STORY.

National service and national education. By ERIC GEORGE. London, P. S. King & Son, 1913. 83 p.

The author takes up anew the problem of national defense which had prior to this writing (1913) been chiefly agitated by the National Service League, who sponsored the sentiments of Lord Roberts in "Fallacies and Facts" (1911) and later in "Christmas Message to the Nation."

Mr. George attacks the proposals made by the National Service League, contending that their words are only "generalities." The National Service League proposes a scheme of general compulsory military training for all between 18 and 21 for a continuous period of from 4 to 6 months. Mr. George condemns the plan from the following standpoints:

1. Training at this age breaks up commercial relations and thwarts vocation. This is a man's critical period in his industrial career.

2. Military training at this age unfits the man for everything but routine duty.

3. Compulsory military training for men is undemocratic and unpopular.

4. The National Service League's plan is far in excess of demand.

5. The National Service League's plan overlooks (as most schemes do) the educational aspects of military training.

The author attempts a plan based on the following principles:

1. Military training should be a part of public education and suited to the different grades (elementary and secondary).

2. Military training is the complement of a defective educational system, and should therefore be given, since it is the true source of teaching patriotism, eliminating child labor, avoiding "blind alley" careers, and leveling social classes, presupposing as it rightfully should a longer school career for all.

3. Discipline in boyhood is badly needed and military training is just the thing to give it—no one is a good leader unless he has first been a good obeyor.

4. Military training supplies the needed physical training which boys must have and do not under the present system get.

5. The discipline given by military training from say 14 to 18 could be calculated to carry over into later industrial life to great advantage—this would help solve labor problems, strikes, etc.

6. Training at this proposed early age avoids all the traditional army faults.

7. The Boy Scout movement has the same psychological basis but does not meet the national need, since there is so much dallying—George Junior Republics in U. S. A. are exaggerated egos.

8. A sense of discipline is the main thing lacking in our present educational system. This discipline must be supplied.

The proposals advocated are as follows:

"1. All boys must have physical exercises and simple squad-training at school. Primary education in arms.

"2. Immediately on leaving school, if at or under 16 years of age, they must have a minimum period of one year at a training school, at which the curriculum shall be partly military, partly industrial and mental, with strict discipline enforced.

"3. If at school beyond the age of 16, or after leaving the training school, they must be members up to the age of 18 of the Officers' Training Corps, or Cadet Corps, which shall be given more attention than heretofore, with a number of drills, musketry course, and three weeks' camp each year, as compulsory features of the training.

"4. After the age of 18, retain on a voluntary basis our army, Regular, Special Reserve, and Territorials, as at present, only resorting to compulsion if and when these regulations had proved a failure."

Military history shows that only since the practice of mercenary soldiery, has the idea of early military training and national defense been transferred to more adult years.

The foregoing scheme would not only be psychologically correct in supplanting Boy Scouts and Church Lad Brigades with a system that had "raison d'être" but it would stimulate habits of:

1. Common decency.
2. Cleanliness.
3. Correct sex habits by reason of necessary segregation at 14 under this scheme.
4. Anti-snobbery.
5. Endurance.

The hierarchy of educational aims is shown by the author to be: 1, Moral; 2, Physical; 3, Intellectual and Industrial, all which the author claims might reasonably be expected to function at the proper time if his scheme were adopted.

"Broadly, the itinerary should be early morning on the square, morning in the workshop or at the desk, afternoon in the field, evening in the class-room.

"In detail something as follows:

"6.00—Reveille.
"6.30—Chapel (not exceeding 10 minutes).
"7.00-7.45—Drill.
"8.00—Breakfast.
"9.30-12 (with interval)—Trade teaching or desk work.
"12.30-1.00 (alternate days)—Drill.

"1.15—Dinner.
"2.30 (outdoor)—Alternate days, military field work and games.
"5.00 (4 days a week)—Class-room.
"6.00—Tea.
"6.45-7.45—Class-room, informal.
"7.45—Chapel (again not exceeding 10 minutes).
"8.30—Supper.
"9.00—Lights out."

"With these provisions for temporary help the schools should be amply staffed as follows:

"For a colony of 500 boys—
"Headmaster.
"Chaplain.
"5 housemasters.
"20 instructors in various trades.
"5 sergeants and other non-commissioned officers of regulars.
"5 matrons, nurses, etc."

The author's concluding chapter summarizes his arguments:

1. Compulsory training in his scheme would be easy to enforce.
2. It would vitalize the school curriculum.
3. It would give opportunity to learn a trade.
4. It would cure social evils.
5. It would be an economic way (in the long run) of maintaining a trained body of citizen soldiers.

J. W. S.

Festskrift til Overlærer J. Nicolaysen's 70 aars jubilæum. KRISTIANIA, J. W. CAPPELEN, 1917.

The well known schoolman and author of textbooks, J. Nicolaysen, has recently celebrated his 70th birthday. In honor of and gratitude to the worthy veteran, J. W. Cappelen's publishing house has published a *Festschrift* with a content that is remarkable. To this *Festschrift* eleven scientists have contributed, among whom are one Swedish and two Danish. After a poem dedicated to the celebrated man, the series of articles begins with one by Professor Dr. Otto Anderson on *A Few Words to and about Oberlehrer J. Nicolaysen.* In a clear and elegant style that is his own Dr. Anderson talks about several controversies with Nicolaysen on substantial disagreements and closes with pleasant reminiscences of the Norwegian educational meetings.

The Danish teacher, G. J. Arvin, writes on his gratitude to the Norwegian master of mathematics for what he has learned from him and tells about the lines he is now following in the difficult task of teaching children abstract numbers by concrete material—assisting the students with sticks, pieces of rocks, diagrams, blocks, etc.—in "self-observation and self-activity," in agreement with the fundamental principle of child-psychology, which the so-called activity school now tries to have introduced in all instruction, a principle to which *Oberlehrer* Nicolaysen has in practice indeed given most assistance in this country by his contributions to elementary arithmetic.

Of special interest is Dr. Helga Eng's contribution, in which she attempts to find, on scientific grounds, the reasons for children's difficulty in expressing themselves.

Drawing essentially on "the attempts of reproduction," the chief result that the author comes to is that synthetic or associative thinking is characteristic of the child, not in such a way, however, that the child as yet grasps logical combinations but simply adds one thing to the other purely associatively, for instance, bear—animal. According to Dr. Eng's statement this result is in contrast to the results of the well known German child-psychologist, Meumann.

The author's results certainly seem to agree, however, with most of the parents' and teachers' practical experience, so self-evidently correct that the present reviewer finds it inexplicable that Meumann could have found anything else. Careful investigator that he is, he has at any rate not made any sweeping generalisation, including all children in the same category (as far as one can find out). It would be interesting to get references to the passage and the context in which this discussion of Meumann's occurs *in extenso* in order to be able to judge it better.

Otto Grenners' article occupies an important part of the *Festschrift, Random Remarks on the Relation of the School to Superstition.* The indefatigable Norwegian pedagogue who for a number of years has sacrificed health and money for the purpose, so far in this country ungrateful, of lifting the schools up to a modern level, has here again made a well thought out and excellent contribution. According to the opinion of the present reviewer, the question of use and misuse in schools and homes of adventures and fables is of paramount importance. In an experimental study (*Zeitschrift für pädagogische Psychologie,* Leipzig, 1916), I have raised this question myself. It is and remains a folk-psychological problem how far we in this country are to foster the Peer Gynt dream and imaginary type. Has not the time come for the testing of all means for the production of a more rational imagination, if I may express myself that way, for the aid and support of daily deeds and future activity? Generation after generation the seed is sown to what a people is and shall be. Every blessed "Askeladd" ("*ashkid*") has made me angry a thousand times. The children do not understand the moment of genius in him. On the contrary what many of them understand is that there is a Norwegian young man whose life's duty is "to dig in the dirt," and just because he is a sleepy slabberer always gets the princess and at least half of the kingdom. It is an important matter that Grenners discusses historically and thoroughly. It has a bearing, in my opinion, far exceeding a "school-problem."

Miss Sofie Lövdal, who has studied modern occupations for children abroad, and who has given, in a couple of books, good and very opportune guidance for Norwegian schools and homes, writes an illustrated article on pin-laying, paper-clipping, plasticine modeling, etc. The well chosen and exhaustive bibliography is especially good.

Such a veteran as school-superintendent Fr. Wilh. Neuberth, who for fully a generation has lived and worked for the school and its activities and many times brought us new impulses from other countries, writes on the unity-school (*Einheitschule*), so much talked about now, to which he earnestly believes the future belongs. Neuberth goes over the history of the movement among us and as former superintendent of both primary and secondary schools takes up many practical questions for discussion. Here is found a very refreshing stimulus to the performance of duty in our secondary schools, a school-reform which, in the opinion of the reviewer, may at once be carried out. I quote with pleasure from him: Consider for instance the textbooks of the secondary schools, how difficult and heavy they are to read, how much they contain of uninteresting, yes, tiresome stuff, tasteless to the child. Thus in the secondary school the boys and girls must, in mathematics, bother about bills of exchange, mortgages, clearing of bankruptcy, communal and federal bonds, effective and nominal bases of interest, the fineness of silver and gold, and so on; in the history of our country about commissions of arbitration, and other things; in the history of the North about Jac de la Gardie, the count of Pfalzbrücken; in the history of the world about an Assyrian king

"Assur Nazir-Bal"—Titus Mantius—Decius—Prusias—a king Gentarm in France, a "Count Perigord," etc., etc. We may agree or not agree with the author's fundamental views as to the question of the unity-schools, but we owe him thanks for all the concrete and stimulating facts that he contributes from his large and many-sided experience to the schools and the authorities.

The Swedish supervisor of the schools, Anna Sandsröm, writes on *Education—A Joy*. Pure idealist as she is, she closes with the following words: "The union of a whole people in joy over mutual spiritual treasures is the best form of democracy, the most noble form of education."

Our own Anna Sethne writes judiciously and well on *Imitation and Activity in Children*. In reading her paper one is struck by the fact how much we who are interested in child-psychology can learn by comparison with experienced parents and teachers.

Einar Sigmund publishes the thesis for his doctor's degree at our university and deals bravely and well with *Modern Ideals of Knowledge and Aims of Education*. In itself a good brief presentation. The reviewer, who has tried to follow the work in this field for a number of years, would, however, have liked to see the absolute principle of definite references to sources carried through, a principle which historical pedagogy may now generally subject itself to.

The book closes with a specially stirring and substantial discussion by the Danish judicial counsellor, Fr. Thomassen, in which he reviews the history of the development of the apparatus used in teaching children to count, beginning with the Chinese Suan-pan arithmetical board (mentioned 550 B. C.) and coming down to the latest Norwegian device.

In general it may be said that the *Festschrift* in honor of Oberlehrer Nicolaysen is also an honor to editor, publisher, and contributors. It should be found in every library. The book is well gotten up.

MARTIN L. REYMERT.

BOOK NOTES

An introduction to child psychology. By CHARLES W. WADDLE. Boston, Houghton Mifflin Co. (c. 1918). 317 p.

The author has not attempted to write a complete treatise on child psychology, because the topic is growing so fast. It is designed as an introduction to the subject for normal schools, colleges and universities. There is little room for finality, and great variety of opinion. The chief topics treated are, the historical background of the scientific study of children, its methods, biological perspective, heredity, non-learned human behavior, play, linguistic development, drawings, moral nature, delinquency, mental development. The book has various figures and tables. Perhaps its chief value, however, is that it has an excellent selected bibliography at the end of every chapter. This was greatly needed and constitutes one of the merits of the book, which is an excellent one. It is auspicious for the further development of child study that this book and that of Luckey, "Essentials of Child Study," which appeared at about the same time, and which are both very valuable, have so little in common. This fact suggests the magnitude of the field and the impossibility of treating it adequately in a single volume, which both these writers not only admit but stress.

Problems of subnormality. By J. E. WALLACE WALLIN. Yonkers-on-Hudson, World Book Co., 1917. 485 p.

There are four basal questions relating to the mentally subnormal, first, the development of the art of differential diagnosis of degrees and types; second, differential treatment in accordance with this diagnosis; third, organization of systems of after-care; and fourth, preventive measures. The first is logically the most basal. The chapters in this book, after the introduction by Dr. Withers, are (1) Changing Attitude toward the Subnormal; (2) Who is Feeble-Minded? (3) General Principles and Facts in Organizing Work for Such Children; (4) The Problem of the Feeble-Minded in its Educational and Social Bearings; (5) Problem of Epilepsy in its Psychological, Educational, Social and Medical Relations; (6) State Provisions for Defective Children; (7) Hygiene of Eugenic Generation. The author has had a wide and varied experience in this field and his book is a valuable contribution.

Introduction to the scientific study of education. By CHARLES HUBBARD JUDD. Boston, Ginn and Co. (c. 1918). 333 p.

This book, we are told, is the result of eight years of experimentation in the University of Chicago. In 1909 the education department abandoned the practice of requiring courses in the history of education and psychology for intending teachers, and substituted one in introduction to education and one in methods. This was due to the belief that students needed to be introduced to school problems in a more concrete way, and this book is one attempt to do this. Of its twenty-three chapters the following perhaps are typical: professional training, science of education, health supervision, scientific supervision, play, select administrative problems, class-room management, methods, standardization, systematic studies of the curriculum, individual differences, the principles influencing the organization of the curriculum, specialized education versus general, school buildings, grouping in classes, etc.

Originality; a popular study of the creative mind. By T. Sharper Knowlson. Philadelphia, J. B. Lippincott Co., 1918. 304 p.

The author's practice is to show the purpose of a study of creative thought, and to develop an interest in it; also to make suggestions as to the natural history of mind in its most inspired moments; and finally, to institute a regime for the individual whereby he may secure the highest mental efficiency. It is an ambitious program. The first section considers the natural history of genius, beginning with a study of consciousness, its traits and implications, as a form of energy, its relations to the unconscious. The second section deals with the origin of new ideas considering inspiration as a natural process, its laws, limits and pathology. The third treats of biological factors, age and sex. The fourth treats of hindrances which are found in the sense of the past, effective home-training, false education, the lack of a science of reading, low standards of merit, incomplete effort, the professional mind. The fifth section, looking ahead, inquires if originality is now possible and makes conjectures about it for the future; while the last section, praxis, is devoted to reflections on mental attitudes and methods.

Civic biology; a textbook of problems, local and national, that can be solved only by civic coöperation. By Clifton F. Hodge and Jean Dawson. Boston, Ginn and Co. (c. 1918). 381 p.

This is a new book, though it has been in the making for a number of years. It is enough to say that it is a fitting next step to Dr. Hodge's "Nature Study," which marked an epoch in the teaching of biology in the grades. This is more adapted to the high school and will doubtless prove no less epoch-making. The measure of our present needs, we are told, is seen in the wastefulness and loss that we find in the world to-day, for perhaps half a million valuable lives are sacrificed annually by preventable diseases, along with billions of dollars' worth of food and other property, swept away by rats, insects, weeds and fungi. The authors well ask how much higher must the cost of living soar before we begin to awake from the dream that we are a scientific and efficient people. The thirty-two chapters of the book are illustrated by somewhat less than two hundred cuts which are well chosen. The authors take a broad view of their subject and draw wisely and well from the vast resources of modern biology, and show us very clearly how biological laws underlie civilization in ways that the public does not realize but which the war is bringing home.

Catholicity; a treatise on the unity of religions. By R. Heber Newton. New York, G. P. Putnam's Sons, 1918. 362 p.

This is the author's second posthumous volume, the other being "The Mysticism of Music" in 1915. He had planned the volume and chosen the title and designated its contents. Its main chapters are, Christianity as a Rebaptized Paganism; The Cipher of the Cross; The Witness of Sacred Symbolism to the Unity of Religion; Christianity, the Flower of Paganism; The Hidden Wisdom of Paganism; The Open Secret of Christianity; Religions and Religions; The Limits of Fellowship; Possibilities of Common Worship; Christianity in Evolution; The Survival of the Fittest.

Memory and the learning process. By Darwin Oliver Lyon. Baltimore, Warwick and York, 1917. 84 p.

The five chapters here are as follows: on the forms of mental activity included under memory; subdivisions of memory in general, with special reference to their relations to the learning process; relation of the length of material to time taken for learning and the optimum distribution of time; the relation of quickness of learning to retentiveness; educational value of psychological research, with especial reference to economy in learning and mnemonic systems.

The Oregon missions; the story of how the line was run between Canada and the United States. By James W. Bashford. New York, Abingdon Press, (c. 1918). 311 p.

This is an interesting portrayal of the deeds which determined the boundary line between Great Britain and the United States from the Rocky Mountains to the Pacific Ocean. The work begins with the Indians' search for God, and subsequent chapters treat of Jason Lee, the Hudson's Bay Company, the Catholic Church, the United States Government, Oregon pioneers, mission work, the provisional government, and finally, Marcus Whitman.

The small family system. Is it injurious or immoral? By C. V. Drysdale. New York, B. W. Huebsch, 1917. 196 p.

This work, after two suggestive prefaces, gives opinions of medical authorities, and finally of clerical authorities, and contrasts with their opinion the way in which members of these professions act. The subject is discussed in further chapters from the standpoint of public health, preventive methods and cancer, morality, limitation and social reform, the single child system, progress since 1913, and the war and the birth rate commission.

The case for birth control; a supplementary brief and statement of facts. Prepared by Margaret H. Sanger. 1917. 251 p.

This work treats in successive chapters of the origin and practice of birth control in various countries; the population and the birth rate; infant morality; maternal mortality and diseases affected by pregnancy; harmful methods practised to avoid large families; prostitution, feeble-mindedness, and venereal diseases; other transmissible diseases and pauperism; and finally, conclusions and opinions, with a glossary added.

Methods and standards for local school surveys. By Don C. Bliss. Boston, D. C. Heath and Co., (c. 1918). 264 p.

This is a convenient epitome dealing with, first, the general conditions; then the organization and administration; the supervisory and training staff; salaries; pupils; efficiency of instruction; course of study and the time schedule; the school as a social and community center; buildings; hygiene; finance; planning for future needs; statistical interpretation; graphical representation.

Report on some measurements in spelling in schools of the Borough of Richmond, City of New York. Issued by the Division of Reference and Research, Eugene A. Nifenecker, Assistant Director. New York, Department of Education, 1918. 88 p.

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THE FUNDAMENTAL PRINCIPLE OF HYGIENE

By WILLIAM H. BURNHAM, Clark University

If we take a kernel of grain from the tomb of an Egyptian mummy that has been preserved for 3000 years and a kernel of grain from last year's harvest, the two apparently are exactly alike; but if we stimulate them by electricity, the latter responds causing a blazing up of the current, the other does not. If we stimulate them by crushing, the latter responds by an increased elimination of CO_2 indicating increased metabolism, the other does not respond. If we put the two into the ground under suitable conditions, the latter responds by growth, the other does not (27).

Thus the difference between the living organism and dead matter is the ability of the former to respond to stimulation; and these three tests determine living tissue: first, the possibility of growth; second, response to electrical stimulation; third, chemical response to stimulation. These forms of response are based on the fundamental characteristic of living matter, irritability; each of these represents probably a change in metabolism. This ability to respond to stimulation is the test of life everywhere, and an optimum stimulation and response represent the condition of health.

It is not the place here to discuss the nature of the processes involved in stimulation. Those interested can consult the book on "Irritability" by Verworn (28) and the recent article on "Stimulation" by Professor Lillie in the Popular Science Monthly (17). Loeb is critical of the word stimulation, saying it is apt to be used to hide our ignorance of causes. While this may be true as regards deeper biological causes, and it may be well in some cases to avoid the use of the word as Loeb does, in psychology and hygiene, on the other hand, a generic word of this kind is indispensable.

To maintain a condition of healthful function, it is necessary to keep stimulation and response within certain limits; overstimulation, understimulation, overreaction, and lack of reaction, are alike injurious to health. Hence the fundamental principle of hygiene may be stated tentatively in terms of stimulation and response somewhat as follows:

To maintain the human organism in a condition of health it is necessary that each organ receive an optimum stimulation and have opportunity for normal response.

Any significant change in environment is the stimulus for a reaction of the organism involving a change in metabolism. Thus all the problems of hygiene are probably fundamentally problems of metabolism. This way of looking at the activity of living tissue does not of course take us anywhere in particular. It does not tell us what metabolism is, nor does it solve our concrete problems ordinarily; but it places the emphasis upon function, it puts hygiene in harmony with other sciences, and it does give the right attitude. This attitude, general though it is, is an important one. It makes us look in the right direction for the solution of our problems; and one is much more likely to see the sunrise if looking toward the east than if looking toward the west. It is not a mere tag for labeling different forms of behavior, and the like; but it is really a significant statement of the fundamental condition of life and health in a general form, and it gives the proper point of view for understanding many problems that otherwise are likely to be obscure.

First of all this point of view puts hygiene in line with the other sciences with which it is closely connected. Hygiene bases its doctrines on the teachings of modern chemistry, biology, physiology, and psychology. Unfortunately the results of these sciences often remain unused for many years before their significance for hygiene is recognized. That the contribution of these sciences may be utilized as quickly as possible it is especially desirable that the point of view and methods of hygiene should be in harmony with those used in these subjects.

Nothing perhaps would express better the general point of view of the recent investigations in these related sciences significant for hygiene than this of stimulation and response. It is illustrated notably in chemistry, in the modern studies of katalysis and the like; in biology, in the phenomena of animal behavior; in physiology, in the notable experimental discoveries in regard to respiration and the functioning of the other vital organs; in psychology, not only in genetic and comparative psychology, but to a large extent in general psychology, obviously in the psychophysical phenomena; and even in philosophy, one school at least, the modern pragmatists, defines the theory of knowledge in terms of reaction to stimulation. Thus Professor Dewey's position, as interpreted by Miss Goodsell (II). is with an organism whose continued existence depends upon acquaintance with things and successful reaction to them, we may naturally raise the question, " Is it not probable that man first acquired knowledge in the struggle to act efficaciously in response to concrete stimuli?" In like manner the best general point of view for modern hygiene is that which looks upon the normal healthful activity of the organism as best expressed in terms of stimulus and reaction.

Stimulation

A few years ago we looked upon the whole matter of stimulation as a relatively simple thing; now we see that it is vastly complex. Roughly there are three kinds of stimuli; first, the blood stimuli, which may be illustrated by the hydrogen ion concentration of the blood, which serves as a stimulus to respiration; second, the socalled hormones from the glands with internal secretion, which are also carried by the blood, but are specific stimuli regulating growth and the distribution of energy in the body; and third, the nervous stimuli, which again represent a vastly more complex mechanism than used to be supposed.

1. *The Blood Stimuli.*—The process of respiration furnishes a good example of the significance of the blood stimuli. The activity of the breathing center located in the medulla is regulated especially by the stimulating substances carried to it by the blood. The mechanism is complex, in part as follows:

We never expel all the air from the lungs. What is left is called the alveolar air. Normal respiration is largely conditioned by the residual CO_2 in this air. Under ordinary conditions it is estimated that the air in the pulmonary alveoli contains 500 parts of CO_2 per 10,000 of air. If this gas is removed by modern methods or by forced breathing, the result is that the patient ceases to breathe. In other words, it is necessary that there should be about 5-6 per cent of CO_2 in the lungs, as a stimulus that is transferred to the blood and carried to the breathing center. Thus respiration, as shown by modern studies, is a case of response to stimulation. The CO_2 in the lungs is the stimulus and the respiration is the response. If the alvelolar CO_2 is too great, that is, the stimulus too strong, then there is increased respiration. If, on the other hand, the alveolar CO_2 is too small, that is, the stimulus too weak, the respiration is reduced; and with extreme ventilation of the lungs and extreme reduction of the CO_2 respiration ceases altogether.

Haldane's studies (12) have shown that cessation of respiration, or apnea, is "simply due to excessive removal of carbon dioxide from the alveolar air." That is, the proper stimulus is lacking and the reaction does not occur. Under ordinary circumstances the amount of residual CO_2 is maintained remarkably constant. If one breathes deeply, the respiration is slow. If one breathes rapidly, the respiration is shallow.

As already suggested, the reserve or alveolar CO_2 determines the amount of CO_2 in the blood. This in turn determines the action of the respiratory center in the medulla. This center reacts with great delicacy to slight changes in the blood. To put the whole matter perhaps more accurately, we may say that the alveolar CO_2 determines the hydrogen ion concentration of the blood, and this is the stimulus to the respiratory center. The response is reaction of the center in determining the activity of respiration. (12a, p. 29.)

That the alveolar CO_2 is really the original stimulus has been proved by experiments by Fredericq which have shown that apnea is produced when the respiratory center of one animal is supplied with blood from another animal whose lungs have been excessively ventilated, thus reducing the amount of alveolar CO_2 and causing an over aeration of the arterial blood.

The condition of the blood which causes increased respiration on the one hand, or apnea on the other, is excessive acidity or too great alkalinity of the blood; and modern study has shown that the alkalinity or acidity of a liquid depends upon its hydrogen ion concentration. As already noted the alveolar CO_2 percentage under ordinary resting conditions is practically constant and this shows that the hydrogen ion concentration of the blood is regulated with the greatest delicacy, and it is regulated apart from breathing. Breathing simply regulates the rapid disturbances in the hydrogen ion concentration caused by variations in the production of CO_2. Other disturbances are regulated otherwise than by breathing. The kidneys and liver play a part in this regulation.

Thus modern physiology shows that respiration is interconnected with a number of other normal activities. As Haldane expresses it:

> "Now let us look back for a moment, and see where we now stand. The experimental study of the physiology of breathing has led us to the discovery of four normals, the maintenance of which

furnishes the interpretation of a mass of what would otherwise be isolated and unintelligible observations. We have first of all the normal alveolar CO_2 pressure. This turns out to be directly subordinate to the normal regulation of the hydrogen ion concentration of the blood, the normal reaction of the respiratory center to hydrogen ion concentration, and the normal regulation of the capacity of the blood for carrying CO_2. With the discovery of each of these normals we have obtained deeper and deeper insight into the physiology of breathing. We have done this, not by merely seeking for causes in the physical sense, but by seeking for interconnected normals and their organization with reference to one another and to other organic normals." (12a, p. 30.)

The marvelous manner in which the conditions of health are determined by keeping the proper balance between the stimulation of the environment and the reaction of the organism is thus illustrated by the results of modern physiology that show the way the vital functions like respiration depend on a most delicate balance between the internal forces of the organism. The extreme complexity of this organic balance is suggested in the following passage from Haldane:

"An obvious possible interpretation is that each of the various organs concerned in the balancing process has such a physical and chemical structure that it reacts to a given small deviation in the internal environment so as to prevent further deviation in this direction. As the combined result of the reactions of all the organs the internal environment as a whole remains constant. It is evident, for instance, that the respiratory centre reacts to very small differences in the hydrogen ion concentration in the blood, in such a way as to prevent larger differences from occurring. The temperature-regulating centre reacts to small differences in the blood-temperature. The kidneys react in a similar way to very small differences in the concentrations of water, urea, and numerous other inorganic or organic substances. The organs, such as the liver, or fat-containing tissues, in which material is stored, appear to behave similarly; and we have now every reason to believe that we should find the same regulating activity in every organ or part of the body if our methods of investigation were sufficiently delicate, and we knew the small differences to be detected. In every direction the progress of physiology and pathology is revealing the astounding delicacy and complication of the regulating processes."

Again we may sum the matter up in regard to the normal conditions of CO_2 as the stimulus to respiration in the words of Haldane. "Thus we find that the normal concentration of carbon dioxide in the alveolar air is connected with or subordinate to the normal composition of the blood, the normal activity of the respiratory center, heart, kidneys, and other organs, the normal composition and amount of the food and the normal concentration of oxygen in the air."

Our illustration from the physiology of respiration is instructive, for it shows how our point of view protects us from error. The older physiology of respiration looked upon this vital process as a relatively simple matter, the rythmic processes of expiration and inspiration being regulated by the respiratory center, and this the whole story. From our present point of view of stimulation and response, however, we inquire what is the stimulus to this physiological reaction in the process of respiration and we find the answer in the results of modern investigation which shows it to be a blood stimulus, namely, the alveolar CO_2 and the hydrogen ion concentration in the blood, and we find that this function of respiration instead of being a simple matter is a very complex affair.

Again our present point of view shows the need of CO_2. This socalled poison, which many widely used books today describe as a substance very injurious to the human organism, we find is the necessary stimulus for the vital process of respiration, that it is a constituent of the blood absolutely essential for life and health. It is so vital, as shown by the investigations of Henderson, that, as Haldane puts it, "An environment of CO_2 is apparently as essential as an environment of oxygen."

Such blood stimuli represent apparently the most ancient mode of interconnection and coordination of the different bodily organs. Another class of stimuli, although inadequately known and the subject of diverse opinion, are apparently carried by the blood, but in any case may well be treated as a special class.

2. *The Hormones.*—Another primitive method of communication between different organs of the body is to send a special messenger, or hormone (from the Greek ὁμάω, to send a messenger). The hormones are secretions from the socalled endocrine glands, and act as vitally important stimuli regulating growth and development. Only in recent years has the tremendous importance of the stimulation by the glands with internal secretion been recognized. These glands when functioning in normal mutual relations not only stimulate and regulate normal growth and development, but they furnish the proper stimuli for the various forms of metabolism (2).

Hence all the phenomena of growth and development may be looked upon as phenomena of stimulation and response. If growth is to be normal, there must be the right relation between the stimuli to growth and the opportunity for development. This may be illustrated by the simplest form of growth, that which occurs by putting a seed into the ground. The definite conditions of the soil, temperature, humidity, and the like, are the stimuli, the growth of the seed is the normal reaction to these stimuli. The same is true of growth and development everwhere; but growth in the human body is regulated by certain special stimuli, namely, these secretions of the endocrine glands. In part we know their functions. Roughly we may say: The thyroid stimulates growth. The pituitary inhibits growth. The pineal gland prevents premature development. The parathyroids, thyroid, and adrenals largely regulate metabolism; the mutual relations of these glands condition normal development.

All the growth activities of the organism, from the growth of the individual neurone to that of the skeletal structure of the body, may be represented from this point of view. To illustrate this, we may take the most extreme case, namely, that of the growth, development, and normal condition of the bones of the body. The bony structure we consider permanent and stable. On the contrary, the bone like all the other tissues of the body is subject to continuous processes of metabolism. Recent investigations have shown that the breaking down of old bone, the building up of new bony tissue, anabolism and katabolism, are continually going on, and that the bone by no means represents dead structure, but on the contrary it is the seat of active metabolic processes. The building up of the bony tissue and the health of the structure depend, as in case of all other structures, upon optimum stimulation and reponse, the stimulus to the building up processes being furnished by the glands with internal secretion.

During the early years of life, under the influence of the stimulation from the endocrine glands, the organism responds by the reaction of growth and development. This is the one thing for which the child's organism is fitted. For hygiene it is the fundamentally important thing. Everything else can wait, but this is essential.

When growth ceases, much the same stimuli seem to continue active, but the form of reaction changes from growth to function; and, just as growth is an essential condition of health in the early years, so in maturity, function is an essential condition of health. Apparently the transition from the one form of reaction to the other is a critical matter. It is desirable that by gradual training to habits of healthful activity this transition be effected in part before growth is completed.

The stimulation and regulation of growth by the endocrine glands, we may suppose, is effected by the regulation of metabolism. More concretely, as regards metabolism, the specially important function of the thyroid seems to be iodin metabolism; that of the parathyroids, perhaps calcium metabolism; and that of the adrenals, carbohydrate metabolism. These glands have also mutual relations of stimulation and perhaps of inhibition. Their further action in stimulating function is notably illustrated by the adrenal glands. The effects of stimulation by the secretion from these glands, adrenalin, are many, as shown by recent experiments, among them the following: It maintains the temperature of the body(Doeblin and Fleischman); it increases the number of red blood corpuscles (experiments at Baltimore); in small doses (Hartman and McPhedran) it causes constriction of the vessels of the intestine, the kidney, and generally of the spleen. Increase of the dose causes marked dilatation of the intestine. Especially interesting is the emergency function of the adrenals correlated with emotion and excitement. If we can trust the results found by Cannon (6), the physiological concomitants of emotion are in part as follows:

An increased secretion of adrenalin into the blood serves as an emergency call. All the forces are mobilized for action. There is an increase in the pulse rate, in the blood pressure, in the blood supply to the muscles, an increase in the body temperature, an increased secretion of sugar from the liver, an increase even in the clotting power of the blood, and probably usually a checking of digestion.

The character and constituents of the hormones we do not know. Probably they are of relatively simple chemical constitution and easily destroyed. The things that may be inferred in regard to this class of stimuli have been summed up as follows by Starling(26):

"(1) In the first place, they must not be antigens, i.e., their injection into the blood stream must not involve the production of an anti-body. If this were the case, the hormone, on entering the blood-stream, would meet its anti-body and would be unable to exert any effect on the appropriate reacting organ. Practically all the complex colloid bodies allied to the proteins, e. g., ferments, egg albumin, peptone, sera of different animals, when injected into the blood stream, cause the production of the corresponding anti-body. The hormones must be simpler in character than such substances and probably have a precise and comparatively simple chemical or molecular constitution."

"(2) Since they must be carried by the blood-stream to the reacting organ they must in most cases be susceptible to easy passage through the walls of the blood-vessels if they are to excite a reaction within a fairly short space of time. This consideration would also tend to keep their molecular weight comparatively low."

"(3) As a rule the chemical messenger must excite a state of activity in response to a change in some other part of the body. When the primary change passes away, the action of the hormone should also disappear. On this account it is necessary that the hormone should either be susceptible of easy destruction, by oxidation or otherwise, in the fluids of the body, or be readily excreted, so that its action may not be continued indefinitely."

3. *The Nerve Stimuli.*—Stimuli are carried to the central nervous system either by the sensory nerves or by the blood. It is customary to divide them according to their effect into exciting and depressing stimuli. Exciting stimuli bring about an acceleration, an increase in the intensity of the metabolic processes; depressing stimuli retard and lessen the vital processes or arrest them altogether. We are concerned especially with the stimuli carried by the nerves.

Fröhlich (10) points out that if stimuli are excluded as much as posible from a portion of the nervous system, a changed appearance of the nerve cells results. If the sensory nerves of one area of the central nervous system are severed, or the motor nerves are severed, and thus the innervation of the ganglion cells belonging to them is limited; then after some days, characteristic changes of the nerve cells appear. The Nissl granules disintegrate, the cell nucleus is displaced towards the periphery, the cells become distended, and, finally, there follows a decrease in their mass, a functional atrophy resulting from inactivity. If, on the other hand, the nerve substance is frequently stimulated, we see an increase in the size of the nerve cells and their processes, an hypertrophy as a result of function. This has been shown by the classic experiments of Berger, who studied the visual centers of dogs blind from birth in comparison with those of normal dogs, and found in the one case that the nerve cells were small and embryonic in character, while in the other they were mature and of normal size. Such experiments show that stimulation is an essential condition of normal development of the nerve centers. Also in the study of the genesis of the nervous system, as we have seen, the striking fact appears that it is developed from the outside layer, from the epiblast, not from the mesoblast, and then folded in to make the tube which constitutes its initial form. Thus, as pointed out by Hodge, apparently it is only by contact with an external world of stimuli that the nervous system has its origin.(5)

Stimulation as modern studies have also shown, has played a great part in the phylogenetic development of the nervous system as well as in individual development. While in the case of the individual development of the human nervous system the number of neurones seems to be complete before the end of the second year of life; and in further growth the cells merely increase in size and in the development of their processes, in the phylogenetic development under the influence of stimuli the number of the nerve cells has greatly increased. For example, the cerebellum has the function of maintaining the body equilibrium. In case of the animals that move little, it is only slightly developed; but, on the other hand, in case of birds, it shows an extraordinarily great development. With the development of the brain cortex the same is true. The cortex has its greatest development in the case of man.

Stimulation conditions also the development of the nerve processes. The nerve cells of higher animals show a far greater development of their cell processes than those of lower animals. The rôle of stimulation in the development of the nervous system has been noted in detail in an article by the writer, published in the American Journal of Psychology (5), but we may recall here that the great Spanish neurologist, Ramon y Cajal, has found that the dendrites of the nerve cells, although spreading out almost equally at first, develop especially in the direction from which they get the majority of stimuli and atrophy along the lines from which they receive very few stimuli or none at all. These observations were based chiefly on ontogenetic studies. More recently Kappers (5), the Dutch neurologist has found the same phenomena phylogenetically.

Many concrete examples of the effect of stimulation upon development are given by Kappers. In several papers he has called attention to the fact that the motor nuclei of the oblongata occupy different positions in the different classes of vertebrates, and their different position is apparently caused by the different tracts from which the greatest stimulation comes to these nuclei. The motor nucleus of the tongue, for example, approaches the sensory centers of taste in those animals where taste is localized chiefly in the tongue.

Bok (3) in his study of chicken embryos found that if the morphological relations of the four-day old egg are given, the theory of the genesis of fibrillae by stimulation is sufficient for the explanation of the whole system of fibrillae of this organism, and that stimulation is the key to the whole development of nervous structure. Thus from the genetic point of view function precedes structure, rather than structure, function.

It is not strange that a condition necessary for the development of the nervous system both in the individual and in the phylum should also be necessary for the functioning of the nervous system. If stimulation is decreased, then the intensity of the metabolic processes is decreased and function is retarded; and if stimulation is excluded altogether, function ceases.

All our physiological reactions are adjustments to stimuli, or to changes in our internal condition or in our environment; and it is the function of the nervous system to regulate these adjustments. This is well illustrated in the automatic regulation of the bodily temperature. With most varying conditions of external temperature, as pointed out by Sherrington, this is kept remarkably constant.

In case of the nerves a stimulus is not always followed by a reaction. To take some of the common examples, if dust blows into one's nostrils, at first there is no reaction. It is only after an accumulation of dust has occurred that we sneeze. If a fly lights on one's forehead, the tickling at first produces no result, but after a short time one raises his hand to brush the insect away; so with coughing and many other reflex acts. The reason no reaction occurs at first but does afterwards, is due to the fact that the first stimulation is not sufficient with the degree of irritability present in the nerves involved to produce a response. It does, however, have an influence. A change takes place in the cell, which favors the appropriate reaction. When the next stimulus or a succeeding one occurs then the reaction does take place. This increment of change is called the summation of stimuli.

In other words, the application of the stimulus is followed by a measurable latent period in which the living substance is apparently at rest. The latent period has been especially studied in case of the muscle. It was discovered by Helmholtz more than 60 years ago and has been made the object of many investigations since that time. Tigerstedt has found experimentally that the duration of the latent period varies according to the intensity of the stimulus, the temperature, and the loading of the muscle or fatigue. As Verworn has said, "The facts concerning the whole latent period and its dependence on various factors would be incomprehensible if it were assumed that no alterations whatever take place during the latent period although the stimulus is already operative. In reality, the alterations following a stimulus occur with imperceptible rapidity in the form of molecular interchange. and the latent period is simply an expression of the fact that the primary alterations, being limited in nature, are not registered by our indicators." The nature of these alterations may be electrical; but we do not know.

Another characteristic of nerve function shown by the studies of stimulation and irritability is what is called interference of excitations. When different stimuli act upon the nerve substance we may have on the one hand summation of stimuli or on the other interference. Every cell of an organism is subject to manifold stimuli. Frequently two stimuli interfere with each other and different results follow depending on the specific reaction of the cell and the quality, intensity and duration of the interfering stimuli. Verworn has given many illustrations of interference of excitations, and the phenomenon is of much practical significance.

The doctrine of the reflex arc, with its three phases—an incoming stimulus along an afferent nerve from some receptor organ, a central connecting process, and a response along an efferent nerve to some effector organ, a muscle or a gland—as the functional unit in the nervous system has been made explicit by Sherrington and is generally accepted.

As an illustration of the way this conception is used to explain the activity of the nervous system take the familiar activity in walking. Walking, as the explanation is usually given, is an automatic reflex function consisting simply of a series of reflex arcs. When the movement is once started by an act of the will or an external stimulus bringing about the reaction of contracting the muscles of the leg, the kinetic sensation of this movement is in turn the stimulus that sets free the nervous reaction for the next step, and that again for another, and so on. The activity is merely a series of reflexes. This is a simple and plausible explanation and may be taken as a typical example of explanation by the reflex arc as the functional unit. The recent studies by T. Graham Brown (4), however, cast doubt upon this and make it probable that the functional unit is the activity of what he terms a half center, or possibly a center composed of linked antagonistic half centers. In any case these experiments show that the old view of the reflex arc as representing everything accomplished by the nervous system is altogether too simple to represent adequately the facts.

Brown has studied progression in animals, experimenting with cats, and has used narcotics to paralyze the nerve centers. In this condition of "narcosis progression," as the act of locomotion under the influence of a narcotic is called, the progression takes place even after the peripheral afferent neurones have been paralyzed by the narcotic. Hence in this instance it is not possible that the stimulus from the afferent neurones is the cause of the step reflex, and apparently some other stimulus like the blood stimulus must be the cause. Brown says:

"It places the efferent neurone—or rather the linked pair of antogonistic efferent neurones or 'half-centers'—in an independent position as the morphological substructure of the functional unit of the nervous system. Upon them and activating them may be supposed to play two kinds of stimuli. Of these the first and most primitive is that which corresponds to the 'blood-stimulus' in respiration; and the second is the more recent stimulus conditioned by the afferent path of what we know as the spinal reflex. In the light of this view the primitive activity of the linked 'half-centers'—of the morphological unit—is supposed to be rhythmic; but the rhythm is not looked upon as conditioned in regard to its period by metabolic factors. It is rather regarded as conditioned by the periodic blocking and unblocking ('fatigue'), at a point (synapse?) in the path of 'mutual inhibition' of inhibitory impulses which may have a much faster rate of rhythm of their own, and one perhaps conditioned by such metabolic factors. And again, in the light of this view it will be observed that a mechanism for reciprocal innervation is assumed to exist between the efferent 'half-centers' and not in the (or is not necessarily assumed to be confined in the) afferent neurones."

Apparently we have to count with the fact that both kinds of stimuli, the blood stimuli and the nerve stimuli, may act upon the efferent neurones, and that the former as well as the latter may cause a reaction.

Thus our best conception of normal development of the nervous system seems to be that resulting from an optimum relation between stimulus and response. And this principle illustrated in the development of each individual neurone has specially noteworthy illustration for hygiene in the general development and functioning of the nervous system. Undue stimulation brings about a premature development, and this is likely to result later on in arrest of development. To adapt a figure used by Dr. Donaldson, the growing organism that might have developed into a tree bearing fruit develops prematurely and becomes merely a barren shrub. Hence all hygienists fear any unrelated and precocious developments. On the other hand, lack of stimulation makes development of the nervous system imperfect and the opportunity for higher developments is liable to pass without proper functioning, and again arrest of development occurs. Thus lack of stimulus in a child's environment, lack of proper incentive and opportunity for the functioning of the different organs and faculties at the proper time may result in an arrest of development which simulates the arrest of feeble-mindedness caused by lack of normal stimulation from the glands with internal secretion, or other congenital defect.

DISEASE AS THE RESULT OF ABNORMAL STIMULATION

Stimulation in Cases of Shock.—If the fundamental principle of hygiene is that of optimum stimulation and response, then it would seem probable that in certain cases of disease the natural remedy might be the application of a suitably stimulus. This has proved to be the fact. Evidence that this is so is furnished in certain cases of shock as studied in the present war.

Two kinds of shock should be definitely distinguished. On the one hand, the nervous shock that comes from the noise and excitement of battle, a kind of shock that disorganizes the functioning of the nervous system to such an extent that an individual is liable to all kinds of peculiar and bizarre reactions; and second, shock similar to that in surgical operations, the socalled surgical shock, which is characterized especially by low blood pressure, weak pulse, and a general condition of collapse.

As regards nervous shock, it would appear that if any thing would upset the normal balance between stimulation and response it would be the terrific noise and excitement of modern trench warfare. It is not strange that this often results in shock. It is more remarkable that a forced reaction may effect a cure. In some cases the application of a strong stimulus and the opportunity for response restores the balance. Dr. Porter (24) reports a case:

"A soldier, bent like a ragpicker searching in the dust of Montmartre, was grasped under each arm by a stout assistant surgeon. To the muscles opposing the contracted group, the chief surgeon then applied a strong electric current in such a way that the resultant contraction would inevitably cause the patient to straighten up. The instant this occurred, the assistants walked off with the astonished patient, now in the erect position. The malign spell was broken. The patient saw that he could stand erect, and the battle was won."

If electricity and a forced reaction, as in this method, which is called "torpedoing," will succeed, why not some other violent stimulus, striking the patient, or the like? Probably in some cases it might be helpful, but naturally one does not like to experiment. Porter, however, reports another case that furnishes some evidence.

"One day there came a soldier who refused to be torpedoed. The chief surgeon insisted. The patient struck out wildly. From words they came, alas, to blows! The surgeon was an educated man; he had defended a Thesis; he knew *la boxe;* he was versed in what Littré terms the *pugilat anglais*. And, since knowledge is power, he prevailed—without electricity. The result was a resounding scandal, and the complete cure of the patient. The affair came at length before the Academy. It was decided that a soldier should suffer the surgeon, as a patriotic duty" (24).

In many cases the trouble seems to be a paralysis of the normal ability to respond to normal stimuli. This is illustrated in many cases where the individual loses his ability to speak and apparently to hear. In such cases one of the best methods of cure seems to be to give a strong stimulus while the patient is in a period of excitement. An electric shock, a loud noise, or even psychic stimuli, may effect a cure.

Even surgical shock, the other form of shock, when studied in the light of recent investigations, seems to be in part at least due to interference with normal stimulus and response.

Dr. Henderson of Yale has shown that anything which produces a decrease in the normal amount of CO_2 in the blood causes serious disturbance of the circulation, producing symptoms similar to those observed in the surgical condition known as shock. If this decrease in the CO_2 in the blood produces the symptoms of shock, we may naturally infer that it would be probable in cases of shock that the condition might be caused by a decrease in CO_2.

Dr. Henderson, in a series of articles in the American Journal of Physiology, has given experimental evidence for this, indicating also that "pain, ether-excitement, sorrow, fear, and other conditions inducing shock involve excessive respiration," which would cause great reduction of the CO_2 in the blood.

Crile, who has studied cases of shell shock, reports that traumatic and psychic disturbances both increase the hydrogen ion concentration in the blood. This means increased respiration. Now in the cases like those reported by Dr. Porter, with probably both the serious traumatic lesion and the psychic disturbance, not to mention the extreme muscular exercise which the individual had carried out probably during the battle, there was likely to be this condition of acidity of the blood. Such a condition, as has been shown, causes a decrease in the amount of alveolar CO_2 and the amount of CO_2 in the blood. Naturally this might produce the symptoms of shock. If in any case this were the cause, the natural remedy would seem to be the administration of CO_2. Has CO_2 ever been tried as a remedy? As a matter of fact it has been used by Dr. Porter, and he has furnished us a case that seems to be distinctly in point, where the CO_2 was successfully used, although the case was complicated perhaps by the fact that it was a severe wound of the femur, and in such cases fat globules appear in the blood, which, in Dr. Porter's opinion, are the cause of severe disturbance of circulation and the phenomena of shock. Dr. Porter reports the case as follows:

"I found the surgeons just bandaging the stump of an amputated thigh. The man was pulseless. The head surgeon turned him over to me—they always do: the more desperate the case the more pleased they are to bestow him on some one else. The man was taken to my tent and all the surgeons stood by to see what would happen. He was placed head down on a sloping table. Six large electric lights were arranged between him and his blanket. The mask was put over his head and the carbon dioxide turned on. In three minutes his pulse reappeared. Everyone was much pleased" (24).

Dr. Porter has developed a theory that in such cases of severe wound of the femur, the fat globules that pass into the blood cause the phenomena of shock. It hardly seems necessary to resort to such a theory; for with the decrease of CO_2 and the condition of the blood likely to be present the symptoms of shock might occur.

Whether or not Dr. Porter is right in his theory in regard to the fat globules plugging the capillaries, we have here a case of shock with congestion of the blood in the abdomen. As Porter puts it, "The man was bleeding to death in his own veins." We have also probably a decrease of CO_2 in the blood, as has been suggested. The natural remedy would be the use of CO_2. This was precisely what Dr. Porter resorted to.

The result was successful. The mechanics of the grosser physiological processes involved is well described by Porter:

"The air is drawn into the chest chiefly by the diaphragm, a large flat muscle which separates the chest from the abdomen. When the diaphragm descends in inspiration, the cavity of the chest is enlarged. If a squeezed rubber ball is allowed to expand under water, the surrounding fluid enters the ball. So, when the cavity of the chest is expanded, surrounding fluids enter the chest: the air is sucked in through the trachea, and blood is sucked in through the veins. The blood is sucked into the chest with considerable force. If the normal quiet contraction of the diaphragm so aids the entrance of blood into the chest, its powerful contraction will aid still more. Powerful and frequent contractions are within our command. We have but to increase the carbon dioxide in the inspired air to call forth deep and rapid respiration. The necessary amount of carbon dioxide is not injurious" (24).

This case is clearly a case instructive from our present point of view showing in concrete form the way that healthful respiration is dependent upon the normal stimulus of CO_2, and how serious disorder may be cured by restoring the normal stimulation. This is especially instructive also because it shows the way the normal activity of other vital physiological processes is dependent upon that of respiration. It is surprising to what a large extent defect and disease both physical and mental are due to a disturbance in stimulus or response. This is obviously so in the various disorders of metabolism and development.

Take rickets for example. What is the cause of this disorder so common in childhood? The answer most commonly given is to note some error in the diet of the children afflicted—lack of lime in the food on account of the substitution of artificial foods for the mother's milk, or the mother's food itself defective. Many difficulties are connected with this view; for rickets sometimes occurs in spite of a proper diet, and it does not always occur when there is serious defect in the diet.

The etiology of rickets is not as simple as this. The cause of many cases lies much deeper; but if we inquire in what other ways stimulation may have been defective we are naturally lead to think of the fundamental form of stimulation by the ductless glands, and this apparently is precisely where the cause frequently lies. There was in infancy lack of stimulation and a proper coördination between the different glands with internal secretion causing a lack of the proper calcium metabolism.

Again take the case of defective teeth. The fundamental cause of decaying teeth among civilized peoples in many cases is a lack of proper stimulation to metabolism in the early years of life. The cause frequently pointed out, that of the use of improper food and the lack of the coarser foods and a lack of proper use of the teeth in chewing, are all cases of lack of proper balance between stimulation and response; but the cause frequently lies deeper than all this, and the reason that primitive peoples have better teeth than civilized is by some writers believed to be the fact that primitive peoples live in a condition of out-door life and in an otherwise healthful environment, which does at least ensure normal activity of the glands with internal secretion.

While such disorders of development are largely due to lack of stimulation in the early years, the children afflicted are likely to be over-stimulated or over-repressed in later years. As pointed out by Pritchard this may occur as soon as the child begins to walk.

" When a child," he says, "hitherto suffering from rickets reaches the ambulatory stage, he introduces into his life a new outlet for energy, which is vastly greater in its dependence upon the courses of supply, than all other outlets put together. It is quite true that even the youngest baby is never quite motionless when he is awake, and is constantly calling some muscular activity into play, but the actual number of foot-pounds of work performed are enormously increased the moment the child 'finds the use of his legs.' The rickety child either walks himself into health, or dies on his back from some intercurrent disease such as bronchitis, diarrhoea, or eclampsia. I have seen more than one child done to death by being put into splints to save its legs." (25, p. 59.)

Each organ of the body responds to certain stimulation in a definite manner; for the normal development of each, adequate stimulation is necessary; and defect of development occurs both with under stimulation and with over stimulation. This is illustrated not only in the growth of the body under the influence of the stimulation of the glands with internal secretion, but also in case of the individual organs.

All physiological stimuli, blows, mechanical lesions, poisons of various kinds, illustrate this. Any one of these in slight degree acts as a stimulus; in greater degree as a poison perhaps; in high degree as a deadly agent. Take, for example, almost any one of the common toxins. With sufficiently great dilution the poison acts merely as a physiological stimulus; with greater intensity it is a depressant and a poison, in still greater intensity it is a deadly poison; and the same effect is illustrated in the reaction of the human body to the toxic products of the various infectious diseases, and the like.

All the phenomena of bacteriology can be looked upon from this point of view. The whole doctrine of bacterial infection represents the conflict between invading organisms and the forces of the body. The toxins and antitoxins, the antigens and antibodies, the phenomena of anaphylaxis and anti-anaphylaxis, all represent the phenomena of stimulation and reaction, and are all very naturally approached from this point of view.

Not only are contagious diseases and the doctrine of bacteriology, which gives the modern explanation of them, best understood from the point of view of stimulation and response, but also many chronic diseases may naturally be viewed in that way; and from a hygienic point of view the practical question in many forms of chronic disease is what can be done to restore normal stimulation and response and what is the normal balance between stimulation and reaction that will insure the avoidance of such disease.

Nowhere perhaps is this view of normal stimulation and reaction as the condition of health of a physical organ better illustrated than in the modern doctrine of the hygiene of the heart. The old ideas seems to have been largely that the heart was endowed at birth with just so much potential energy and that it was capable of performing in a lifetime just so much work; hence any violent activity or any unnecessary strain upon the heart, especially in adult life, any unnecessary exercise, as in running or lifting or the like, especially in case of any cardiac weakness, by just so much decreased the store of the heart's energy and by so much would shorten an individual's life. The modern view which looks upon the heart as an organ responding to stimulation like other organs shows that even in case of weakness or disease, the organ is improved by suitable exercise, and this has replaced the old fear of cardiac disease by a hopeful prognosis in most cases, provided proper hygiene of exercise involving normal stimulus and response and the right relation of the activity of the heart to the activity of the other organs are maintained.

Again, as Sir Lauder Brunton has shown, the heart muscle in its contraction massages itself, and so the function of the heart is a prime condition of further function; and often in case of disease, where the heart does not function properly, the giving of digitalis, which acts as a stimulus causing the heart muscle to contract more strongly, brings about by the very fact of this artificially induced exercise the ability to function, so that after a time the drug is not necessary as a stimulus.

The studies by Dr. MacKenzie of London (19) have gone much farther in the study of all cardiac disorders from the point of view of stimulus and response; and in a certain number of cases of heart irregularity, where there is skipping of a beat, or the like, when patients have been seeking for health for years, or in case of soldiers who have been rejected from the army, Dr. MacKenzie has often found that all that was necessary was to tell the patient to give up doctoring and go about his regular work.

These results of medical investigation which show that in many cases cardiac disorder results from lack of stimulation and lack of normal exercise of the heart are corroborated by the studies of Dr. R. Tait McKenzie (20) of Philadelphia, which indicate the advantage of physical exercise and the harmlessness of athletics in most cases.

Thus, the various cardiac disorders are best understood when studied from the point of view of stimulus and reponse, and the view of modern students like Dr. MacKenzie is that the activity of the heart is determined not by any innate stored up potential energy of which the individual has just so much and no more; nor by some inherent power residing in the heart muscle itself; but rather that the heart is a functioning mechanism like any other in the human body, which depends for its health upon proper exercise within the limits of normal stimulation and response, with the normal rhythm of work and rest. The heart continues its healthful function because the normal balance exists between stimulus and response. The failure of the diseased heart is due to disturbance of this normal balance. Dr. MacKenzie says:

. "Now it cannot be too strongly insisted upon that that process, which we recognize as natural in a healthy individual, is identical with the process occurring in an individual having some defect, whether the defect is due to disease of the heart itself or to other factors which embarrass the heart in its work. *The persistent forcing of a heart which is being denied a sufficient period of rest in which to recuperate itself is the real cause of every form of heart failure, no matter what the actual character of the disease may be.*" (19 p. 40.)

The various nervous and mental disorders are, as is well known, due to lack of stimulation or over stimulation or undue reaction to stimulation or repressed reaction, in any case to some disorder in this normal balance. As Pritchard illustrates this by the case of the child subject to rickets:

" The nervous system of the child who lives in the kind of environment that predisposes to rickets is exposed to faulty stimulation of both kinds, from want of stimulation in certain directions, and from over-stimulation in others. The most serious injuries that are inflicted are due to circulating poisons of endogenous manufacture. Faulty feeding, whether in respect of quantity or quality, will ultimately lead to disturbances of digestion or tissue metabolism, and in both cases to the production of poisonous bodies, which damage the delicate nerve-cells." (25, p. 63.)

The body of course may be subject also to various injurious stimuli. Against these, protective reactions have been developed. More concretely, Crile describes these as follows:

"As the tickle reflexes have been developed in response to attacks by insects and carnivora, so other material dangers, such as flying dust and débris, poisons, falling bodies, heat and cold, have added the reflexes of winking, coughing, sneezing, vomiting, fainting, shivering and sweating, which in like manner exemplify the adaptation of the organism as a whole or in part to specific menaces in the environment. Of all the ceptor mechanisms for protection the most wonderfully adequate are the mechanisms which guard the eye." (7, p. 77.)

Sneezing and coughing are striking examples of the protective adaptation of the organism, sneezing protecting the nose and throat from foreign bodies, coughing being a protective adaptation for the larynx and lungs.

Mental disorder and stimulation.—In the comprehensive definition of stimulus given by Verworn which includes any change, the stimuli that come from mental states are included just as much as physical stimuli; and as a matter of fact in our life as human beings these mental stimuli are quite as potent as physical stimuli.

Mental disorders are so largely due to defect in stimulation or reaction that special attention may well be given to the various forms of mental stimuli.

Apart from heredity the cause of mental disorder is usually a poison of some kind from infection or indigestion, or some drug taken into the system, or lack of balance in stimulation from the glands with internal secretion, or the drive from social stimuli; or else, on the other hand, some injurious form of reaction or of repression. In a given case all of these may be combined.

Thus obviously mental disorders may be classified into two general classes; on the one hand, those that result from over stimulation, or under stimulation; and on the other hand those that result from lack of normal reaction, either arrest and repression of reaction, or over-reaction resulting from undue irritability.

Of course stimulation and reaction are usually bound up together in abnormal as well as in normal conditions. Lack of stimulation means lack of reaction; over stimulation means over-reaction; lack of reaction results in lack of stimulation; and over-reaction brings about abnormal irritability. As a rough division, however, for practical purposes this class is convenient.

Of the first class are the many cases of nervous and mental breakdown, especially of the manic-depressive type, and those more serious breakdowns which result from continued over-stimulation and the correlated arterio-sclerosis. Wherever there is constant stimulation from emotional excitement, either from over work or worry, or the like, where the adrenal glands are continually stimulating the thyroid, and the resulting increased metabolism and other physical effects are kept up continuously without rest or respite, as a result of this constant kinetic drive, as Crile calls it, nervous breakdown of serious character is likely to result.

Again in the manic depressive type we have most striking illustration of the serious disorder that occurs when the normal condition of stimulus and reaction is upset. By undue stimulation from overwork or extreme anxiety, and the like, apparently the normal resistance, perhaps the resistance at the synapses between the central nervous system in the spinal cord and the sympathetic nervous system is lowered, undue stimulation of the adrenals occurs, and as a result intense emotions are experienced. Then after the violent reactions to these emotions have expended the individual's energy, extreme depression may ensue, this being in part perhaps the normal reaction to the previous excitement and in part a vicarious functioning of the depressive emotions instead of the more violent ones.

Even in normal individuals over-stimulation may result in nervous weakness or nervous breakdown. This is illustrated over and over again in the soldiers who return from the war. Not only are those suffering from shell shock in a condition of nervous weakness and disorder for a long period until opportunity for reëducation has been given, but even those who come back apparently in normal condition without pronounced shock nevertheless are found for a period of perhaps some months after their return likely to be in such a condition of nervous weakness as the result of the prolonged stimulation of active service that they are not capable of performing their ordinary activities.

Again in many forms of nervous and mental disorder we have the phenomena of unmotivated fear, anger, and the like, the patient becomes violent at the slightest occasion, the slightest stimuli bring forth most violent reactions, in such cases there seems to be a general over irritability in the nervous tissue or else an abnormal functioning of the glands with internal secretion. Professor James long ago suggested that in such cases "We must suppose the nervous machinery to be so 'labile' in some one emotional direction that almost every stimulus (however inappropriate) causes it to upset in that way, and to engender the particular complex of feelings of which the psychic body of the emotion consists."

The cure of mental disorder when possible is brought about by something that reduces the abnormal stimulation. This in actual practice occurs in several different ways. The abnormal stimulation, if it be a poison or infection, may be removed by taking away the source of the poison, although in many cases this is an extremely difficult thing to do. Again the overstimulation from abnormal activity of some gland may be cured in some cases by removing a portion of the gland. Again in other cases it may be reduced temporarily by the administration of morphine; and again, in case of emotional overstimulation, this may be reduced in some cases by removing worry and anxiety; and by rest and sleep. Just as in the cause of mental disorder, stimulus and response represent a vicious circle and one involves the other, so in many cases cure may begin either by modifying the abnormal stimulation or by improving the faulty reaction.

Thus in most mental disorders if one would find the cause one must seek for some defect in stimulus and response. If one would prevent mental disorder, one must seek the means of preserving normal balance. The value of this mode of approach in mental hygiene and in the treatment of mental disease is obvious. It gives a simple method of making preliminary study of a given case and it gives an intelligent view of the question whether anything can be done for the patient.

This may seem to represent hygiene as a relatively simple matter, it being merely necessary that one should have plenty of opportunity for work and an environment that favors normal reaction to stimulation, and the essential thing would apparently be merely to avoid over stimulation and overwork, on the one hand, and too little work on the other hand. A little experience, however, shows that even to do this is a difficult thing; and yet the question may naturally be raised why is it that the maintenance of an individual's health, especially one's mental health, is such an extremely complex affair. The answer is given by recent investigations.

With the evolution of the cerebral cortex the nervous system is no longer a mere mechanism for converting stimuli into reactions. The cortex makes association possible and the inhibition of instinctive reactions possible. The remarkable studies of Pavlov and his school[1] have shown that apparently with any stimulus whatever any other stimulus whatever may be associated and produce precisely the same physiological result; and furthermore, that the associated stimulus may even become necessary for the reaction. Kallischer has given socalled tone training to different animals, to monkeys, giving them food with a certain definite tone, and witholding it with other tones. Thus he habituated them to grasp the food only at the proper tone; that is, the tone associated with the giving and eating of the food. Another of these investigators associated a definite tone with the giving of meat, and with this definite tone the secretion of saliva would occur, but without this it did not occur. The discrimination of the dog is so acute that a difference in reaction was developed for even so slight a difference in the associated stimulus as a half or quarter of a note.

In the case of children it comes to pass that with the constant training received from the environment associated stimuli become potent, and soon the individual is governed, not merely by the simple biologically adequate stimuli of an ordinary environment, but by all sorts of artificial stimuli associated with the former. This it is that makes the training of children such a tragically complex matter; and this it is that accounts for the fact that the health of many children is precariously connected with many artificial conditioned stimuli.

In the ordinary behavior of an animal conditioned stimuli, as pointed out by Zéliony, are likely to be complex. The associated stimulus is not a single stimulus but rather a group of stimuli, or, as we should say, a situation. The experiments by Zéliony are especially interesting in this respect and they indicate that in such cases sometimes a single intense stimulus of the situation acts as a conditioned stimulus, sometimes two stimuli may be equally effective if they are of equal intensity, and sometimes the whole group of stimuli, or the whole situation, forms the conditioned stimulus.

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[1] See an article on the conditioned reflex. Ped. Sem., Dec., 1917.

In the case of the higher animals and children it is usually a group of stimuli, or a situation, which form the real stimulus, and reaction is usually to such concrete situations. In the whole of our behavior this is the fact, as has been clearly brought out by Watson and other psychologists. In the experience and education of a child all sorts of more or less artificial stimuli become associated with the primitive stimuli; and these must be studied to determine the hygiene of a child.

One of the strongest of the stimuli in an individual's environment is the presence of other human beings. A great part of the conditioned stimuli are likely to be of this social character.

The child in the group is a different individual from the same child alone. Working in the group he can do more work with the ergograph, he can turn a reel faster, he can add more accurately, he can remember better, and in general can accomplish more than the same child working as an individual.

The objective reality of the social stimuli has been made clear by modern scientific studies. Not only is it true that the presence of other individuals modifies the work and ability of an individual, but whenever significant social relations occur, the result is likely to be a reaction of the glands with internal secretion, and the emotional experience of the individual perhaps merely a concomitant or a result indirectly of the social events acting as direct stimuli to these glands. Crile is apparently quite right in classifying these as objective stimuli like the chemical ceptor stimuli.

It is not difficult to distinguish some of the social events which act as stimuli in the case of all normal individuals. That they are most simple and familiar matters indicates their significance. Among those where the proper balance between stimulus and response is specially significant for the mental health are the following:

(1) Any social event which threatens the life of an individual is of course a specially significant stimulus. If a man in sober earnest threatens to shoot you on sight, or, even if you receive anonymous letters threatening death, and conditions make one take this seriously, or if in any other way one's life be threatened, such an occurrence is a strong stimu-

lus. The normal reaction of course is activity of some kind, to destroy one's enemy, or to imprison him, or to protect oneself, or in rare cases, perhaps a philosophy that makes one reckless in regard to life. All men are susceptible to such stimuli.

(2) Any social event that threatens an individual's personal reputation is a significant stimulus, more effective in the case of most individuals than almost anything else. Shakespeare's character expresses the universal attitude,—"He that steals my purse steals trash, but he that filches from me my good name......makes me poor indeed."

(3) Any social event that assails an individual along the line of the weak place in his character or personality. Every man has a certain residuum of character, whatever his social condition, and this is to him the vitally significant thing. Any event that threatens this or any event that threatens to weaken or destroy one's personality is an intense stimulus and brings about a strong reaction. Freud and Adler have given many illustrations.

(4) Among the higher and more complex stimuli, especially important are those which result from the anticipation by the imagination of future situations when connected with the belief that the latter will become real; or, in other words, the stimuli from expectation. Innumerable illustrations of the strength of such stimuli can be given. Every individual can furnish a multitude of examples from his own experience. Their significance is illustrated everywhere from our conversation about the weather to the formal pronouncements of the law courts.

A failure of things to come out as we expect, a change in the weather, the blocking of our plans by a friend, a *faux pas* on our own part upset us out of all proportion to the matters at stake. Too great a gap between anticipation and fulfilment is dangerous everywhere. Of this we have many illustrations alike in the great war and in the peaceful circles of domestic life.

If perchance things sometimes turn out better than we expect, our joy is again apt to be out of all proportion to the situation. We hail the result as a sort of atonement for hopes long delayed and disappointments long experienced.

This is a matter of everyday psychology. When we expect little and receive much; when we foresee evil, and good comes, "Oh! aint it a grand and glorious feeling!"

If the proper rhythm between expectation and fulfilment does not occur, serious results are liable to follow. In any case, the mental disturbance that results from such breaking of the rhythm of expectation and fulfilment is likely to be great.

From the social point of view the great stimuli in general terms are those from success on the one hand, and from failure on the other. Both for pedagogy and for hygiene these stimuli are of fundamental significance. No case could be cited perhaps that would better show the harmony between sound pedagogy and sound hygiene than the effect, upon the mental development and mental health of an individual, of success and failure.

The importance of failure in its relation to the mental health is not as obvious as that of success, and yet it is easily illustrated. The special danger with many children of superior talents is that by the ease with which they accomplish their tasks and by their superior accomplishments, and the fact that they always stand above their fellows, they acquire an undue estimate of their own ability and their own importance. They become egocentric in an extreme degree, and thus the germs of pathological egomania may be planted in the period of development; and innumerable cases have shown concretely the disastrous results that come in later life from such conditions. Many of these pathological or semi-pathological cases might have been saved by the wholesome stimulus from the discipline of failure, and a truthful estimate of one's own ability and one's own limitations in relation to the vastly greater importance of other superior individuals, and still more of the social groups of which they are members, would have saved them.

From the point of view of pedagogy it is the teacher's business at some time, in some subject, in some way or other, by some method or other, to give every child the opportunity for a noteworthy success. Of course this is specially important in case of the dull and mediocre child. On the other hand, perhaps equally important is the rule that every teacher should give every specially bright child at some time and in some way the opportunity to compete with other children that are superior and to attempt tasks that are specially difficult, so that such bright children may have the benefit that comes from failure.

That it is possible to arrange conditions so that each pupil may have a noteworthy success, and at least the bright pupils have the discipline of failure, has been indicated by practical work in the schoolroom; and some of the methods by which this can be accomplished are suggested by such studies as those of Moede.

Again, as Fröhlich (10) and others have pointed out, the school itself, and all the environment of school conditions, represent the stimuli to which children are subjected during the period of training. School work from this point of view is a systematic attempt to regulate the conditions of stimulation and response in such a way that normal habits of mental activity may be developed.

We have seen that suitable stimulation and adequate response are necessary to healthful functioning. We have seen also that with the development of the cerebral cortex as the organ of association the possibility of stimulation is indefinitely increased. Not only the customary natural stimuli are effective, but apparently any impulse whatever from any receptor organ may become associated with the biologically adequate stimuli and produce the same response. This vicarious functioning brought about by association is not confined, however, to stimulation, it occurs also in reaction. This is illustrated in the simple forms of reaction. If I stimulate the thigh of a decapitated frog with a drop of acid, the animal raises his leg on the same side to brush off the irritating substance. If the leg is removed and the same stimulus applied, the animal no longer able to raise the leg on the same side raises that on the other side to brush away the stimulus. This simplest form of substituted reaction has its analogue in the higher processes. In some cases where normal reaction to emotional impulses is blocked, some other response associated naturally or artificially with the normal reaction may occur. The Freudians have given many illustrations of this, especially in cases of hysteria and the like.

The need of normal reaction to physical stimuli is clear; the danger from repression of normal reaction is obvious. The need of opportunity for adequate reaction to mental stimuli is not as clear. Failure of normal reaction to mental stimuli is more common perhaps than to physical stimuli. Education and social conventions in large part represent repression of natural forms of reaction; and it is only by training in habits of associated reaction that habits of mental health are acquired.

The great contributions of the Freudians to mental hygiene is not their doctrine of the Unconscious, but rather their convincing illustration of the universal need of adequate response to mental stimulation and of the injurious results of repression, and their demonstration of the practical value in many cases of sympathetic thinking about an emotional experience and analysis of mental states as a helpful form of reaction.

Practical Suggestions

The problem of hygiene is to safeguard an organism that depends for its life and health upon optimum stimulation and adequate opportunity for reaction. The limits of normal stimulation and response are relatively narrow. The fundamental impulse of the organism is activity. Every reaction may cause new stimulation. Placed in an environment of varied stimuli, overstimulation is likely to occur. Overstimulation increases reaction and over-reaction increases irritability. On the physical side, the thyroid stimulates the adrenals, and the adrenals react upon the thyroid to increase metabolism, and thus the kinetic drive with its vicious circle is established. The complexity of all this is increased when associated mental stimuli are involved. What can be done for protection? Nature devises many protections.

1. First of all it protects the organism by fatigue. All tissue susceptible to stimulation is subject to fatigue; and fatigue ensures rest. It is a well known fact that excitable tissue functions in rhythmic periods, a period of activity being followed by a refractory period, when the tissue refuses to respond. A single stimulus acting on the rested heart muscle produces a contraction. A second stimulus will not produce a contraction unless a certain period, of about 0.5 seconds in case of the frog's ventricle, has elapsed. The muscle needs this socalled refractory period to recover sufficiently to respond again. The nerve, too, in its electrical responses, shows a refractory period similar to that in the heart, but of much shorter duration. (18, p. 30.)

Again in case of the nervous tissue, the nervous mechanism especially involved in fatigue is admirably adapted to protect the inner and more vital parts of the nervous mechanism. In neuro-muscular fatigue, for example, the end-plate fatigues most quickly of all; and this serves as a protection to the more important parts of the mechanism. After the end-plate, again the synapse, the point of connection between the neurones, seems to be easily fatigued; and the fatigue of the synapse stops reaction and thus protects the more central nervous mechanism. The end-plate has been compared to a safety fuse in an electric motor and serves as a protection in case of most occasions for injurious reactions.

The human being is protected also by the conscious feeling of fatigue, or perhaps more accurately, by the ennui that precedes fatigue. It is only in great emergencies that we have opportunity to observe extreme fatigue in ourselves. The present war has furnished some of the best illustrations. These not only show that fatigue is a protection but illustrate the fact that in fatigue a greater stimulation can produce reaction.

A war correspondent[2] has reported a case in point. Of these soldiers he says: "When called on to make one last effort after six days and nights of fighting and marching many of them staggered up like men who had been chloroformed, with dazed eyes and gray and drawn faces, speechless and deaf to words spoken to them, blind to the menace about them, seemingly at the last grip of strength.

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[2] Herald-Journal, April 4, 1918.

"All my men are very cheery, but very tired," was the report of their General at a most critical time. "Being attacked," he says, "was the only thing that kept them awake. Towards the end of this fighting they had a drunken craving for sleep and slept standing with their heads falling against a parapet, slept sitting hunched in ditches and slept like dead men when they lay in the open ground, but they waked again when the enemy attacked once more, and fought him and killed him, and dozed off again.

The effectiveness of this protection is also illustrated by the report of the same correspondent. He says:

"In body and brain these men of ours were tired to the point of death. They were footsore and their limbs were stiff and they felt like old, old men; yet after a few days' rest they were again young and fresh."

"That is an astounding thing. Yesterday I went again among these Highlanders who fought so long and so hard, and upon my faith it was almost impossible to believe they were the same men. Their pipers were marching up and down the roads playing 'Highland Laddie' and other tunes of Scotland, and Gordons and Seaforths and Argyles stood about in the evening sunshine like men on the village green taking their ease in times of peace. Their kilts were dirty and stained, but they had washed off the dirt of battle, had shaved, and cleaned their steel hats, and the tiredness had gone out of their eyes and their youth had come back to them."

2. Nature protects the organism by habituation to stimuli. In its simplest form this seems to be a case of fatigue. A stimuli has its maximum effect the first time it acts. Thereafter its effect grows less and less. There is always this law of the diminishing intensity of response to stimulation. The law of summation of stimuli is no exception because that merely applies to small stimuli that are not sufficient to produce reaction. When a number of small stimuli have accumulated their effect, so that finally a response comes, the summated stimuli really form the first adequate stimulation, and any second application of the same has less effect. This law which appears first in the ordinary psychophysic law is valid throughout the whole realm of feeling and emotion. As Titchener and the other psychologists have put it, the feelings tend to dull themselves by repetition. This dulling is nature's protection against over-

stimulation, and its importance is seen in the psychology of everyday life and in all the great crises of life. It is this that gives the value to training, for the surgeon operating in the hospital, for the soldier on the field of battle, or the child learning adaptation to his environment. Innumerable examples of the law of the diminishing intensity of feeling could be cited. We may note the most recent and most obvious.

The war furnishes many illustrations of the law of the diminishing intensity of feeling. The soldier's training depends very largely upon this. The soldier becomes habituated to the noise of the cannon, to the various shocks of warfare and the like, and then ceases to be excited by them. The people in Paris were not seriously alarmed by long distance bombardment or the like because during the last three years they have become habituated to many and varied shocks and surprises of aerial bombardment and the like. If shells were thrown into Worcester in precisely the same way at intervals of quarter of an hour, a large part of the city would be in a panic, not because Americans are less courageous than Parisians, but because the Parisians have become dulled to such experiences. At the first aerial bombardment of Paris probably there was as much alarm as would be felt here. All of us were shocked at the first reported casualties of the war. Now we read of greater ones with what four years ago would have seemed heartless indifference. Thus the law of the diminishing intensity of feeling protects us from the incredible and apparently unendurable horrors of war.

Fear, rage, anger, pleasant and unpleasant feelings, moods of exaltation and depression, whether by means of the physical conditions correlated with them or by virtue of association with biologically adequate stimuli, are all effective stimuli in calling forth significant reactions. As indirect stimuli we may refer to social situations that call forth these feelings. Even the abstract ideas—glory, honor, country, home, democracy, freedom, duty,—we recognize as powerful stimuli; but we consider them all weak unless there is something beyond the abstract conception, unless they quicken the pulse, tense the nerves, and produce we know not how many physical changes, unless in popular phrase they "touch the heart."

Apparently they become symbols that act as conditioned stimuli because associated with the masterful feelings mentioned, and thus call forth significant physical results. As Loeb has expressed it, "since Pavlov and his pupils have succeeded in causing the secretion of saliva in a dog by optic and acoustic signals, it seems no longer strange to us that what the philosopher calls an idea is a process which can cause chemical changes in the body."

3. Coördinated action. As the diminishing intensity of feeling is due on the one hand to fatigue, on the other it is due to the elimination of unessential processes. As soon as the response to stimulation becomes coördinated, a minimum expenditure of energy occurs and a minimum of emotional disturbance. Thus all nature's training in response to stimuli gradually brings about this great protection.

In mental activity the rules of hygiene suggest protections against the trying situations of life similar to those nature has provided in the nervous system. First of all the dulling of the stimuli by repetition is always a good method of preparation. Wherever one has to encounter a trying experience, if it be possible to rehearse the situation beforehand it makes it possible to dull the stimuli. This has been the method used from the days of Aristotle's catharsis down to the preparation of the soldiers in the present war. The effort is made to habituate the soldiers to the trying experiences of trench warfare, the noise of the high explosives, the barrage, the bayonet charge, and the like.

Any form of coördinated activity serves as a protection. To adapt Professor James' classic statement of the case, if all the energy is utilized in coördinated action none is left to run down into the viscera and make a man afraid. Thus our soldiers in the thick of the fight say that they have no time to be afraid; and so in general as long as one can give attention one controls one's emotions. Hence it comes to pass that we devise all sorts of coördinated actions to serve as protection—from putting the hands in the pocket, lighting a cigarette, profanity, or what not, to more elaborate coördinated action in concentrating attention on one's work, or repeating a formula or a prayer.

Again is the protection that comes from knowledge. This of course is really protection by an associated idea. We all experience this in a hundred ways. If in a blizzard the gale strikes upon our windows we reflect upon the strength of the glass, the security of the bolts and the like, and feel no anxiety; and in every situation of extreme peril, if at once we know that our defense is secure, that at once checks the fear. As has been well said, complete knowledge would mean the entire eradication of fear.

If we may trust the investigations by Crile, they have shown, on the one hand, that the effect of the abnormal mental stimulation from worry and the like is precisely the same physically as that from the poison of infections; and, on the other hand, that the effect of the removal of worry and anxiety and habits of normal sleep is the same as that which comes from the removal of a portion of the abnormally active glands by operation or from the giving of morphine. This has put a tremendous emphasis on normal mental hygiene, and it has shown that in both cases the cause of the mental disorder is to be looked for in the lack of balance between stimulation and response and the means of cure is again to be sought in the restoration of the normal balance.

Again, as associated mechanisms of protection, Crile has pointed out the protection that comes from our knowledge that worry itself is injurious. He and Dr. Cannon have both noted that this may serve as a distinct protection against injurious emotions. Dr. Crile says:

"The effect of fear, grief, worry and jealousy on the physical body is seen in the changes in the cells of the brain, the adrenals and the liver, and in the numerous resultant diseases and disabilities. Against man's inhumanity to man, religions and philosophies have been evolved, each of which aids in proportion to its power to substitute altruism for selfishness, to substitute faith for fear. Thus in understanding the physical basis of the action of faith and hope, as opposed to fear, despair, anger and grief, we have at our command a concrete force which can be efficiently used to protect the individual. As the knowledge of disgrace and punishment prevents dishonesty; as the knowledge of contagion prevents exposure to contagion, so the mere knowlege—the conviction—that excessive anger, work, jealousy, envy, worry or grief cause physical damage as serious as that produced by infections or crushing blows will constitute a powerful protection to man. The knowledge that these activations not only decrease the power of the individual to do his work, but ultimately cause numerous diseases as well, will result automatically in arousing the instinct of self-preservation, which will surround the individual with a protecting circle, through which anger, jealousy, grief, and worry cannot penetrate, just as the zone of local anaesthesia in the anociated surgical operation is an impenetrable barrier between the brain and the knife, making the surgical operation shockless." (7, p. 377.)

Lack of stimulation is quite as bad as over-stimulation in relation to health and development. Lack of change is lack of stimulation, and in the monotonous environment to which many by their daily tasks are doomed it is almost impossible to receive that stimulation necessary for health. Hence the various devices, resort to drugs, and the like, for relieving the deadly monotony.

In normal persons constantly subjected to the repetition of a monotonous life a positive need for stimulation of some kind seems to develop. This again is seen in noteworthy manner in the army where soldiers for a long period are subjected to the routine of camp life and the like; some means of recreation seems to be absolutely necessary for the maintenance of the mental health; and as Leuba, Patrick, and others have attempted to show, this demand for relief from monotonous surroundings is one of the factors which lead men to seek change by the use of alcohol and other drugs; and Patrick even maintains that this demand is one of the factors leading to war among nations and causing the pleasure that most people take in strenuous games like football, which represent in miniature the serious habits of their ancestors.

"The need for relaxation by excitation," says Leuba, (16, p. 583.) "is so universal that means of gratification have everywhere, and at all times, been sanctioned by society. Sacred and secular festivals, to which various purposes may be assigned, but which serve primarily to refresh through relaxation, form a part of the order of every society. When the Faculty of Paris threatened to abolish the Feast of Fools, a petition was presented with the following argument: 'Wine casks would burst if we failed sometimes to remove the bung and let in air. Now we are all ill-bound casks and barrels which would let out the wine of wisdom if by constant devotion and the fear of God we allowed it to ferment....Thus on some days we give ourselves up to sport, so that with the greater zeal we may afterwards return to the worship of God.' When one means of refreshing the organism becomes impossible another is substituted."

Quite as bad perhaps are the pedantic habits of responding to small stimuli likely to be developed when no strong and varied stimuli are present. Students counting their steps to chapel or noting all the signs on the street, purists correcting the errors in grammer and punctuation as they read, Samuel Johnson touching all the lamp posts as he walked, are so many cases in point; and the best cure is apt to be a strong stimulus that absorbs all attention in a vigorous normal reaction.

The limits of normal stimulation and response are narrow. Hence it is very difficult to maintain the normal relations. The great danger to health in the conditions of modern life is that of over-stimulation, or of lack of opportunity for normal reaction, or of both. Of course it has always been true that there was this danger; and yet in the conditions of modern life this seems to be a peculiar danger.

Still more dangerous perhaps, especially in the period of development, is the lack of opportunity for normal reaction. The repression common in all education, both in the home and the school, the slavery to outworn and useless conventions in society, and the inhibition of normal and wholesome impulses by the limitations of poverty and monotonous daily tasks, furnish examples of the lack of opportunity for normal reaction so familiar that concrete illustration is hardly necessary. Of pathological examples a multitude have been furnished by the psychoanalysts. In many cases all that is necessary is to give opportunity for some long repressed reaction to occur.

The Avoidance of Error.—The doctrines of hygiene have always been mixed with traditions and superstitions, and even the scientific history of hygiene is strewn with the fragments of exploded theories. The point of view here presented being in harmony with that of the other sciences would render the discoveries of science more readily available for hygiene and furnish protection from many errors. A few examples are instructive.

The whole history of ventilation, for example, has been largely the history of error. The errors in regard to CO_2 to which I have referred furnish one noteworthy example. The tradition in regard to the injurious effects of CO_2 is so strong that it seems to be very difficult to get the errors out of the textbooks, although for more than thirty years hygienists have known that the CO_2 even in the worst ventilated rooms does not seem to be injurious. We take the CO_2 as a gauge of the impurity of the air simply because it is usually in bad company. If an abnormal amount of CO_2 is present the air is usually foul for other reasons. It is merely a good constituent in bad company; for, as we have seen, a certain percentage of CO_2 is the necessary stimulus to respiration and a constituent of the blood absolutely essential to health.

Interesting also are the errors in regard to reinspiration of the air. (8, p. 451.) Some of the older writers asserted that the expired air is such a deadly poison that to rebreathe one's own breath a few times would prove fatal. More recently methods of ventilation have been devised with the aim of removing the expired air immediately from the face so that it cannot be rebreathed. The difficulty of displacing the expired air in this way is so great that probably all that most of these systems accomplish is to delay rather than prevent the reinspiration, so that the plan amounts really like other systems of ventilation to mere dilution. The theory is erroneous, being based on the idea of chemical purity as the proper standard of ventilation and ignoring nature's method of ventilating the lungs by dilution. If some of the amateur hygienists could have their way children would die of apnea.

One is led to suspect that the medical profession has not been free from the delusion in regard to the dangers of reinspiration; for the old method of giving an anaesthetic by inspiration from a bag placed over the mouth and nose has been given up, although I am told that with the old method the cases of surgical shock were much fewer, perhaps on account of the stimulus to respiration from the greater amount of CO_2 inspired.

Especially in regard to these common matters of daily life does error seem to prevail. A remarkable example is the current doctrine in regard to food. The vagaries in regard to diet are legion. Even the scientific studies have concerned chiefly the different food elements required and the amount of each for individuals of different age and occupation. Balanced diets and rules for eating have been worked out with great care, but children still often fail to thrive and adults still suffer from indigestion. We are just beginning to see the importance of studying eating and digestion as response to stimulation; and, thanks to Pavlov and his school, we find that digestion waits on appetite and that appetite depends on proper stimulation.

The effect of varied and attractive diet and pleasant surroundings may be referred to as the effect of suggestion; but it is a very potent and subtle form of suggestion, and it seems to apply to animals as well as men. Dr. Pearl reports that a colony of rats that did not thrive on the most approved scientific ration, improved remarkably when given access to garbage. He reports also from his own investigation an experiment with hens. One flock was fed the most correct chicken diet known, containing every necessary element in the right proportion, all placed together in one bin. In case of the other flock each kind of food was put separately in a bin by itself, and the hens were free to eat much or little from any one of the bins. "The results of this experiment," says Dr. Pearl, "were really startling. The hens fed on the pick-and-choose system not only gained more flesh and laid more eggs than those fed on the unvaried ration, but they also ate very much less food—thirty per cent less fat and thirty per cent less protein, to be exact." (23)

Apparently, whether in men or animals, the more the process of eating assumes the character of a mechanical task instead of voluntary response to stimulation, the less the value of the digestion that follows.

In the hygiene of the nervous system perhaps especially many errors have prevailed, because it has been regarded, not as a vital physical organ, whose healthful development and preservation depend upon vigorous and regular functioning, but rather as a storage battery weak and fragile with a limited amount of potential energy to be most carefully guarded and conserved. As a matter of fact the nerve tissue is one of the toughest things in the world when given the opportunity to function naturally in rhythmic periods of storage and explosion of energy. An insight into the fundamental principle of hygiene would have saved hygienists from the error, on the one hand, of thinking that nerve substance is above physical laws and capable of functioning indefinitely without fatigue, and from the fatal practice of working when over-fatigued, and, on the other hand, from supposing that the only thing necessary is care for rest, the storing of energy, and economy in expending energy, while ignoring the need of vigorous explosion of energy as a necessary condition of the normal building up processes in a succeeding period of rest.

While most psychiatrists have now come to see the need for nerve rest and the storing of energy, many still fail to realize the importance of the normal expenditure of energy.

Hygiene has been slow to learn the truth from other sciences; and sometimes error long prevails in spite of truth established in chemistry and physiology. The scientific results found in other sciences should, however, be made quickly available, and there is no excuse for the prevalence of error after the truth has been found; hence the need of a new point of view in hygiene, that will make it less easy to fall into the traditional errors and more easy, on the other hand, quickly to adopt the results of modern scientific investigation. Accordingly the attempt has been made here to present such a point of view.

Conclusion

In developing this fundamental principle of hygiene we have likewise developed its fundamental method. While for hygiene it is necessary to avoid over-stimulation, and, if it be possible, overreaction, modern hygiene is positive rather than negative, and it puts the emphasis on exposing the organism to healthful and necessary stimulation and on development of habits of healthful reaction in the widest sense.

We thus see the practical harmony of the method of hygiene and the method of education. Education consists in developing certain instinctive reactions and habits of reaction based upon these, certain attitudes and interests. Teachers are slowly discovering that the only way this can be done is by placing pupils in situations where they will be exposed to certain stimuli with full opportunity to respond. This fundamental principle and method of education and the errors that result when this is ignored have been well expressed by Professor Hocking of Harvard in his recent volume upon "Human nature and its remaking." Noting that in developing a child's instincts exposure to stimulation that may appeal to him is the first work of education, Professor Hocking adds:

> "If we were dealing with an organism whose instincts we did not know, the educing process would consist in exposing that organism, much as one would expose a photographic plate, to various environments to see which ones would elicit reactions. And in dealing with a new human being, always unknown, the work of educing his instincts would likewise consist in *exposing* him to those stimuli which may appeal to him,—to speech, to things graspable or ownable, to color, form, music, etc., to the goods of cleanliness, truthfulness, and the like. What powers any child has of responding to these things, whether or how far they will *take* in his case, neither he nor we can know until he has been exposed—and perhaps persistently and painfully exposed—to specific examples of these goods. . . .
>
> And the first peril of education is not that the child's will will be overborne, but that through no exposure or inadequate exposure to the objects that would call out his best responses, he achieves only half a will instead of a whole one, a will partly-developed and therefore feebly-initiative, casual, spiritless, uninterested. If I were to name the chief defect of contemporary education, it would not be that it turns out persons who believe and behave as their fathers did—it does not; but that it produces so many stunted wills, wills prematurely gray and incapable of greatness, not because of lack of endowment, but because they have never been searchingly exposed to what is noble, generous, and faith-provoking." (14.)

From our present point of view it is not strange that education, in the sense of exposure to normal and varied stimulation, is the fundamental method of hygiene; and that re-education is often the best means of cure in both physical and mental disorder.

Thus the fundamental aim of hygiene is the development of normal function; the fundamental principle, the maintenance of an optimum stimulation and reaction; the fundamental method, the exposure to normal stimuli, with opportunity for complete reaction.

The tentative formulation of our principle which we used at the outset may now be modified to read as follows: The health of an organ depends upon optimum stimulation and response and the proper balance between the activity of the given organ and the activities of other related organs. By stimulus is meant any change internal or external that affects the organism; and by response any reaction physical or mental.

What constitutes normal stimulation and response must be determined by long and careful scientific investigation. At present our concrete knowledge is small. Thus hygiene is rightly called the science of the future. But the principle here formulated puts hygiene in harmony with other sciences, it gives the right point of view, it helps protect the student from error. And by the well-established rules of scientific method, of first hand observation, induction from experience, and verification, we may expect the future science will be built.

This simple outline has of course ignored the conditions that complicate the hygienic problem of stimulation and response—varying degrees of irritability in the nervous tissue, individual differences in sensitiveness to stimuli, the modifiability of tissue by response, reserve forces in the nervous system, and the many conditions, internal and external, that affect stimulation and response. Some of the facts in regard to these conditions are especially important for hygiene, but they form another story that cannot be told here.

If the goal attained after our long discussion is disappointing because it is merely our starting point, it is no small gain to see clearly that the aim of hygiene is positive and not negative.

The great fundamental error of the older hygiene was in looking upon its function as negative, the mere combatting of the enemies to man's health. Of course hygiene does seek to remedy injurious conditions, but the aim of modern hygiene is essentially positive, to keep the proper balance of internal forces and functions, and to keep every organ of the body in normal activity. Irritability, normal metabolism, function, the power to work, are the conditions of health everywhere from protoplasm to man. Modern hygiene aims at the most efficient function, the most complete development, it aims to raise the health level, to make an individual immune to disease, and to develop habits of health. While searching for further knowledge the practical task of hygiene is to apply the concrete facts already established.

Again the study of this fundamental principle of hygiene suggests the method by which we may hope to build up a science of practical hygiene. Just as the new pedagogy founded by Comenius studies nature to find the principles of sound education, so modern hygiene should study nature's methods of protection to determine the principles of hygiene.

The limits of normal stimulation and response are, as we have seen, relatively narrow, but nature devises all sorts of protections against undue stimulation and abnormal reaction. In the first place nature protects the organism in large degree from injurious stimuli. The eye is protected from mechanical agents by the reflex closing the eyelids and from too intense light by the curtain of the iris. The nose protects from injurious stimuli from foreign bodies, extremely cold air, and the like; the skin itself protects all the nerves of touch; and the most important part of the nervous system is protected by the solid box we call the skull.

Again nature protects from over-stimulation by fatigue, as is illustrated in noteworthy manner by the adaptation of the retina of the eye to seeing in the light. This apparently is a phenomenon of fatigue. We see in the sunlight without injury because while in the light the retina is permanently fatigued.

Still further nature protects from all the injurious stimuli that enter the organism. Against bacterial infection she provides anti-bodies and antitoxins and develops some form of immunity against all toxic agents.

What seems to be the general law has been expressed by Dr. Welch as follows: "The struggle between the bacteria and the body cells in infections may be conceived as an immunizing contest in which each participant is stimulated by its opponent to the production of cytotoxins hostile to the other, and thereby endeavours to make itself immune against its antagonist."

Perhaps equally significant are nature's methods of protecting the organism against abnormal response to stimulation. The stimuli to growth from the thyroid and other glands are held in check by the secretion from the pituitary gland thus preventing over growth and giantism. The most vital organ, the heart, is protected from over-response to stimulation by the inhibitory action of the vagus nerve; and the deeper and more vital portions of the nervous system are protected from over-reaction by the fact that the peripheral end-plates are easily fatigued.

Thus if the methods of hygiene are to be natural and efficient they will aim to remove injurious stimuli as far as possible, to protect against abnormal stimulation by the development of immunity, to prevent habits of abnormal reaction by developing habits of coördinated activity that are hygienic; and in mental hygiene to protect from over stimulation and abnormal reaction by analogous methods.

Bibliography

1. Adler, Alfred. The neurotic constitution. Moffat, Yard & Co., London, 1917. 465 p. Tr. by Glueck, B. and Lind, J. E.
2. Biedl, A. Innere Sekretion. Urban, Berlin. 1913. 2 vols.
3. Bok, S. T. Die Entwicklung der Hirnnerven und ihrer zentralen Bahnen. Folia neuro-biologica. 1915. Vol. 9, p. 475-565.
4. Brown, T. Graham. On the nature of the fundamental activity of the nervous centres; together with an analysis of the conditioning of rhythmic activity in progression, and a theory of the evolution of function in the nervous system. *Jour. of Physiology*, 1914, Vol. 48, p. 18-46.
5. Burnham, William H. The significance of stimulation in the development of the nervous system. *Amer. Jour. of Psychology*, 1917, Vol. 28, p. 38-56.
6. Cannon, W. B. Bodily changes in pain, hunger, fear and rage. Appleton, N. Y. 1915. 311 p.
7. Crile, George W. Man an adaptive mechanism. Macmillan, N. Y. 1916. 387 p.

8. Crowder, Thomas R. On the reinspiration of expired air. The Archives of Internal Medicine. 1913. Vol. 12, p. 399-419.
9. Flexner, Simon. Natural resistance to infectious diseases and its reinforcement. *Pop. Sci. Monthly.* 1909. Vol. 75, p. 5-19.
10 Frölich, F. W. Leistungen des Nervensystems und seine Beziehungen zur Unterrichtshygiene. *In* Selter's Handbuch der deutschen Schulhygiene. Steinkopff. Leipzig, 1914. p. 134-173.
11. Goodsell, Willystine. The conflict of naturalism and humanism. Columbia University Contributions to Education. N. Y., 1910. No. 33. 183 p.
12. Haldane, John S. Organism and environment. Yale Univ. Press, New Haven, 1917. 138 p.
12a. Haldane, J. S. The new physiology. The Harvey Lectures, 1916-17, p. 21-41.
13. Hartman, F. A. and McPhedran, L. Further observations on the differential action of adrenalin. *Amer. Jour. of Physiology,* 1917. Vol. 43. p. 311-327.
14. Hocking, William E. Human nature and its remaking. Yale Univ. Press. New Haven, 1918. 434 p.
15. Lessing, T. Der Lärm. Eine Kampfschrift gegen die Geräusche unseres Lebens, Grenzfregan des nerven- und Seelenlebens. 1908. Vol. 8, p. 1-94.
16. Leuba, James H. Extatic intoxication in religion. *American Jour. of Psychology.* 1917. Vol. 28. p. 578-584.
17. Lillie, Ralph S. The general physico-chemical conditions of stimulation in living organisms. *Popular Science Mo.* 1914. Vol. 84. p. 579-589.
18. Lucas, Keith. The conduction of the nervous impulse. Longmans, Green & Co. London, 1917. 102 p.
19. MacKenzie, James. Principles of diagnosis and treatment in heart affections. Frowde, London. 1916. 264 p.
20. McKenzie, R. Tait. The influence of exercise on the heart. Proc. Congress of Hygiene and Demography. Washington, 1913. Vol. 2, Part 2, p. 646-651.
21. Morgan, John J. B. The overcoming of distraction and other resistances. *Archives of Psychology,* 1916. No. 35. 84 p.
22. Patrick, G. T. W. The psychology of relaxation. *Popular Science Monthly.* 1914. Vol. 84, p. 590-604.
23. Pearl, Raymond. When you eat in hotels this summer. *Ladies' Home Journal.* July, 1918. p. 67.
24. Porter, W. T. Shock at the front. *Atlantic Monthly Press.* Boston, 1918. 150 p.
25. Pritchard, Eric. A new theory of rickets. *School Hygiene.* 1917. Vol. 8, 59-64 p.
26. Starling, Ernest H. The principles of human physiology. Lea & Febiger. Philadelphia, 1915. 127 p.
27. Tashiro, Shiro. A chemical sign of life. Univ. of Chicago Press. Chicago, 1917. 142 p.
28. Verworn, Max. Irritability, a physiological analysis of the general effect of stimuli on living substance. Yale Univ. Press. New Haven, 1913. 264 p.

THE DIAGNOSTIC FALLIBILITY OF INTELLIGENCE RATIOS*

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The use of intelligence ratios as an aid in the diagnosis of feeble-mindedness is the outgrowth of a very recent statistical trend in clinical psychology. Just how far this usage may extend one can hardly predict, but a brief exposition of the fallacies involved in any such procedure is surely timely and necessary in the interest of the individual who is diagnosed by such a method. It is also advisable for the protection of social agencies which have to deal with children who have been so diagnosed.

When tests evaluating mentality in terms of mental age were first adopted the ordinary procedure was to determine the child's mental age, compare it with his actual chronological age, and thus ascertain the amount of mental retardation or acceleration, expressed in terms of years of mentality. Over two years of retardation was considered as evidence of feeble-mindedness when the child examined was actually less than nine chronologically. Over three years of retardation was accepted as equally significant in a child over nine years of age. Binet (1), himself, presented this method. He defined idiocy as development corresponding to that of birth to 2 years, imbecility as equal to 2 to 7 years of development, and moronity as beginning at the mental age of 8. He does not define the upper limits of moronity in terms of years, but says it lies below the upper limit of his 1908 scale. No child would, however, be placed in any one of these classified groups unless he were definitely feeble-minded and tested at least two or three years below age. Even then, Binet (1) writes: "It is understood that these diagnoses apply only to the present moment. One who is imbecile today may, by the progress of age, become a moron, or on the contrary remain an imbecile all his life. One knows nothing of that; the prognosis is reserved" (p. 270). Goddard (5) defines the usage of the mental age in similar but much more definite terms, writing, "It has been found that if a child is more than two years backward while he is still under nine years of age, he is probably feeble-minded. For a child above nine, we allow him more than three years backward before we call him defective" (p. 86). At first conservative usage generally interpreted this to mean that four years of retardation were equivalent to feeble-mindedness. Goddard (7), also, uses it in this fashion in estimating the percentage of feeble-minded children found in testing an unselected group of public school children. These two ways of stating the same thing have, however, led to some confusion in the interpretation of various authors where the exact usage is not always stated.

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It will be seen from the above statements from Goddard and Binet that the usage of a mental age without reference to the subject's actual age is not to be condoned, while diagnosis depends not only upon the relativity of the two but also upon the actual chronological age at which such a ratio of mental and chronological age occurs.

Gradually during the last five years there has appeared a tendency to disregard this last factor of the actual age of the child at the time of examination and to classify him diagnostically by the use of some ratio expressing the comparison of his mental and chronological ages. Intelligence quotients, mental quotients, coefficients of intellectual ability, and even "absolute" intelligence ratios have been suggested. To one who is practically engaged in clinical work all of these modifications seem to be an outgrowth of a feeling that the tests are non-diagnostic, or rather that they are not sufficiently so. Each suggestion that findings be treated in this or that way indicates another attempt to make the tests express infallibly and in careful decimal fashion not only differential diagnoses but also prognoses.

Binet saw this difficulty and emphatically stated that the tests are by no means a substitute for the expert in the study of children. He also states that the test level is diagnostic and that "prognosis is reserved," but few of our American writers seem to see the relation of his clear statements, based upon the experience of evolving the scale, to their use of it in clinical fashion.

A mental test by any one test series has, presumably, as one of its immediate purposes, the ascertainment of a mental age. If this mental age be translated into a decimal of the amount the child should do, it becomes what Yerkes terms an intelligence coefficient; if it be translated into a decimal indicating his mental age in relation to his chronological age, it becomes what Terman calls an intelligence quotient and what Stern termed a mental quotient. Otis goes even farther and would attempt to ascertain a child's absolute grade of brightness, compare it with the absolute grade of brightness for his age, and thus obtain an "absolute" intelligence quotient which would, theoretically, enable us to "predict the probable maximum intellectual attainments which he will achieve" (2, p. 140).

The use of any of these ratios, or of the consideration of mental age in relation to chronological age, may then serve two purposes. It may, first of all, classify a child with others of a group doing a similar proportion of normal requirements. In this sense it is diagnostic of present mental level. It is sometimes used to indicate the child's probable future development and in this case it is prognostic. The simplicity of classification by any of the various scales has led to a very general acceptance of the attitude that this differentiation of prognosis and diagnosis is unnecessary, that the two are identical. A child tests at age on the scale now; he is therefore "normal" and will remain "normal." The first application of the term "normal" is diagnostic of the child's present level compared with the level of other children of similar age. The second usage of the term is the result of the inference that once normal always normal. The term implies that, and the inference would be correct were our first diagnostic statement based upon an absolute knowledge of normality. Instead it is based upon a very poorly standardized group of "averages." This prognostic usage is also encouraged by the fact that a classification of any child as feeble-minded has embodied in it the actual prognosis. But even this interpretation is not infallible. The child who tests at age may be normal, defective or psychotic. The child who is more than three years retarded is surely not normal but he may be demented or feeble-minded, or both. The mental age in the second case removes one possibility, that of normality or average endowment, but it leaves three other possible conditions which differ greatly but which no mental age, coefficient, or intelligence quotient, taken alone, can indicate. So far the possibility that the child whose mental age indicates abnormality is insane or a predementia seems to have been almost entirely overlooked. Diagnosis, prognosis included, has been made quantitatively, irrespective of quality of responses. This practice has led to some most conflicting statements regarding mental tests and their application, all of which cannot be true.

Stern (12) was one of the first to propose the use of a ratio for diagnostic purposes. He found years of retardation difficult to handle because the number of years of retardation was different for children of different ages where the mentalities might be the same. He consequently proposed the "mental quotient" or the ratio of the mental age to the actual or chronological age. He defines as feeble-minded all those with quotients below .80. He does not find the quotient entirely satisfactory, however, as it fluctuates on growing children, varying even in the individual from time to time.

The suggestion was nevertheless taken up in this country and has been much in favor with two groups of workers, best represented by their respective leaders, Yerkes and Terman. Yerkes devised the coefficient of intellectual ability, or the number of points a person scores on the Point Scale, divided by the number of points a person of his age should score. He, too, finds that there is a great deal of fluctuation in such a ratio (17), and that it is consequently not wholly reliable. He gives a tentative classification for its use, despite this unreliability, calling those dependent who have a coefficient of .50 or less; those inferior who range from .51 to .70; those subnormal who have a coefficient of .71 to .90. Haines (8), Rossy, and others uphold the use of this method or of some modification of it. Kuhlmann (9) was probably the first man in this country to advocate the use of some such quotient but his work received very little recognition until taken up by Terman (15) and employed as an integral part of the Stanford Revision of the Binet-Simon Scale. He undoubtedly believes in the prognostic value of the intelligence quotient for, acknowledging the need of supplementing "the social criterion (of feeble-mindedness) with a more strictly psychological one," he adds, "For this purpose there is nothing else as significant as the I Q.' All who test below 70 I Q by the Stanford revision of the Binet-Simon scale should be considered as feeble-minded and it is an open question whether it would not be justifiable to consider 75 I Q as the lower limit of "normal" intelligence. Certainly a large proportion falling between 70 and 75 can hardly be classed as other than feeble-minded, even according to the social criterion" (13, p. 81).

Because of this Terman does not apply the I Q with extreme rigidity, but recognizes a borderline group which he defines as "those which fall near the boundary between that grade of mental deficiency which will be generally recognized as such and the higher group usually classed as normal but dull." He continues "It must be emphasized, however, that this doubtful group is not marked off by definite I Q limits. Some children with I Q as high as 75 or even 80 will have to be classified as feeble-minded; some as low as 70 I Q may be so well endowed in other mental traits that they may manage as adults to get along fairly well in a simple environment. The ability to compete with one's fellows in the social and industrial world does not depend upon intelligence alone.

Such factors as moral traits, industry, environment to be encountered, personal appearance, and influential relatives are also involved. Two children classified above as feeble-minded had an I Q as high as 75. In these cases the emotional, moral, or physical qualities were so defective as to render normal social life out of the question. This is occasionally true even with an I Q as high as 80" (13, pp. 87-88).

Even to the uncritical reader it must be apparent from these statements that Terman places 80 as the very highest limit of I Q for even a borderline defective. This interpretation is re-enforced by his statements regarding those whose quotients run between 80 and 90, where he places "those children who would not, according to any of the commonly accepted social standards, be considered feeble-minded, but who are nevertheless far enough below the actual average of intelligence among races of western European descent that they cannot make ordinary school progress or master other intellectual difficulties which average children are equal to" (13, p. 92). He also states that they have found only one exceptionally intelligent child who appeared feeble-minded. He is ten years old with an I Q of 125 and he is described by Terman as "a case of disturbed emotional and social development with superior intelligence." Of course this reliability of the intelligence quotient holds only for the Stanford revision of the scale, but on it he feels it is quite dependable for he adds, "Since the distribution of I Q's remains practically the same at all ages from 5 to 14, it is evident that the usual method of expressing intelligence status in terms of years of retardation or acceleration is misleading. 'A year of retardation' is a unit which has no constant value. A year of deviation at age 6 is exactly equivalent to a deviation of 18 mos. at age 9 and to 2 years at age 12, etc." (15, p. 557). He acknowledges that it is necessary to test children several times in order to be sure that their I Q's are constant and he does not feel that the repeated examinations of children by examiners who were not using the Stanford revision are data which may be relied upon for they "involved the use of a very imperfect scale, the worst feature of which is that its inaccuracy is unequal at different age levels" (15, p. 557). Recently he has repeated these assertions although he has slightly modified his statement by acknowledging that the I Q's of feeble-minded children "tend to decrease considerably" (14, pp. 55-56).

Emphatic endorsement of the coefficient of intelligence, the intelligence quotient or other exact numerical rating used clinically seems practically confined to the two groups of workers represented by Yerkes and Terman. Criticism of these ratios and of the things for which they stand has also come chiefly from two sources, that is, from Wallin and from those workers who may be grouped together as having been trained under Goddard. Wallin strikes the right line of criticism when, by a fair use of the intelligence quotient, he shows that *on the average* the I Q is higher for normals than for morons, and that indeed "the intelligence quotient decreases with each descending category of intelligence" (16, p. 265), but that it overlaps greatly for the individual cases in the various categories. It is the old fallacy of applying a median or a mean to the individual and then finding fault with him when it does not fit. Wallin advocates a conservative use of all methods of diagnosis and shows that the problem of the I Q is far more complicated than Terman would have us believe for not only the I Q of the defective, but also the I Q of the normal child tends to fall as he increases in age, even before he reaches the teens.

The Vineland attitude is usually thought of by those who are not acquainted with the laboratory itself as holding closely to the views expressed in the first articles which, emanating from there, first acquainted American workers with the work of Binet. A child more than three years retarded was considered feeble-minded, all others were not feeble-minded. But neither Goddard or his students have ever kept to any such a hard and fast interpretation of numerical results. Goddard (6) reported in 1913 that "there are some indications, however, that some children are pretty nearly normal until about eight or nine years of age and then they stop rather suddenly. For example, children test normal at six, and defective at ten, never having developed beyond seven" (p. 125). Because of this he at that time raised the question as to how the child reaches his point of arrested development. Some children seem to reach it abruptly and others slowly show retardation.

From the very beginning of re-examinations by the first year scale the Vineland records began to show the child who tested "at age" and who then began to lose standing mentally. The experience with these cases has been reported by Doll (2, 3, 4) in his articles on potential feeble-mindedness. A potentially feeble-minded child is one who is actually feeble-minded but he does not test sufficiently below age by the mental tests to fit the mathematical definition of 3 or 4 years of retardation. Time shows that he has reached his limit of mental development and he gradually becomes one, two and then more than two years retarded. These children cannot be called borderline cases for we are too generally using that term to designate the case who is so high-grade that it is doubtful whether he is or is not feeble-minded. The borderline cases are adolescent or older and test high on the year scale. These potential feeble-minded children are comparatively young, of any age up to thirteen and they need not necessarily prove to be morons. They have simply happened to be examined before their actual inferiority has had a chance to show itself. Such children when examined in a clinic where the I Q or a coefficient of intellectual ability is used as the basis of diagnosis will be classed as normal one year, backward the next year and feeble-minded a year or two later. Unfortunately this actually happens. In the time between the diagnosis of normal and that of feeble-minded, social agencies, teachers, courts and homes have to deal in a disheartened way with the inferior material handed over to their care. Only too often they, and not the clinician, are blamed for the lack of good results.

If the potentially feeble-minded child exists in even moderate numbers, then I Q's cannot remain constant. Terman would probably reply that it is the use of an imperfect scale which has brought about this seeming disturbance of test values and that the situation will clear up with the use of a more perfect test series. We might try to show that if such criticism applies to the old scale when used in testing feeble-minded children, whose I Q's decrease, it would also apply when testing normal children, whose I Q's remain constant despite the variation of the scale. These children would undoubtedly have varying I Q's on a scale where the I Q's of the feeble-minded remained constant. Instead, however, of following any such line of argument let us assume the irregular formation of the Goddard revision. The scale may be harder at one point, easier at another, yet for children who are tested on the same part of the scale the difficulty should be just as exactly comparable as on a scale that was exactly graded. Consequently, if we take a group of children who are all of the same mental level, have the same I Q and, hence, the same chronological age, we ought to be allowed to expect equal development of them on the scale. The I Q's they achieve may vary on different parts of the scale, according to the difficulty of that part, but the variation should be approximately the same for all of them or else the assumption of I Q permanency is false. It may be possible that the average child will be found to have an I Q of 120 at the age of four on the Goddard scale, an I Q of 110 at the age of seven, of 100 at the age of nine, and even less above that age. A gradual decrease of this sort would then be the norm to be expected of all children who at the age of four had I Q's of 120. These figures are merely suggestive for as yet little has been done with the problem of following the average child through a long enough period to see him safely above the limits of possible feeble-mindedness.

The writer has been interested in following such development with clinic and institutional types where the first findings were not sufficiently conclusive to allow of diagnosis. In a large part of this work the only scale available at the time of the first observation (because of the recency of the Point and the Stanford) was the Goddard revision. In some cases it was the only scale available for the first two or three years of the continued observation on the child. Because of this, and in order to meet any criticism of the scale used, it will be necessary to study the children who at some one age had the same mental age. These children would thus have the same, or approximately the same, I Q's and theoretically the same chance for future mental development. The largest group which is available for such study consists of the children who when first seen and studied were between their seventh and eighth birthdays. During the past two years fifteen children of that age who tested normal when first seen have been intensively studied in the Waverley laboratory. These children were taken into the institution on observation or sometimes on a regular commitment after having been under observation. It is of this group that I wish to treat in detail, for experience with them has not shown that they are uniformly dull normals, progress with even similar I Q's, nor are to be classed under any one diagnostic heading at the present time, or, indeed, at similar intervals after their first examinations.

When first seen these fifteen children ranged in chronological age from 7 years 0 months to 7 years 11 months. Their mental ages by the Binet-Simon scale ranged from 6.8 years to 7.8 years, their I Q's ranging from 93 to 103, only one being as low as 93 and all of the others being 96 or more. Terman claims that the Goddard revision is easier than the Stanford and finds as much as ten points of difference in the I Q's of seven year olds on the two scales. Since he designates an I Q of 80 on the Stanford as the upper limit of feeble-mindedness, an extra allowance of ten points on the Goddard revision would probably be the most he could demand as an I Q criterion of feeble-mindedness at the age of seven, for this is his own scale comparison. That would give an I Q of 90 as the highest probable score of a seven year old feeble-minded child. With even this rather lenient correction all of the children in the group mentioned above would fall completely outside the limits of such a classification for feeble-mindedness.

The continued observation of these fifteen children has been rather enlightening. At the present time the youngest child of the group is 7 years 4 months old and the oldest child is 12 years 2 months of age. The variation in age is due to the difference in the length of time they have been under observation. Their mental ages by the same revision of the Binet now range from 7.0 to 10.4. The I Q's now range from 70 to 99, with a median at 86. In general the decrease in the ratio of mental age to chronological age is greater the longer the time the child has been studied, but this is not uniformly the case. One boy changed his I Q but one point in two and a half years, that point was gained. Another lost three points in the same length of time, while a third child lost ten points and another twenty-four points in a little less than three years. This does not look as though the I Q were at all stable even with children of the same age who were once similarly endowed, so far as the tests could show endowment. Fortunately, two of our boys were exactly the same age when first examined (7 years 10 months) and tested exactly the same (7.8) on the scale, I Q's both being 99. The one was re-examined recently at the age of 10 years 0 months and tests 8.2 years, I Q 82. The other was re-examined at the age of 10 years 3 months and scored 9.8 years with an I Q of 96. At the time of the last examination both children were given the Stanford scale also. The former tested 7 years 6 months, I Q 75, the latter scored 10 years, I Q 98. The former is a definitely feeble-minded boy, the latter is not, yet they were both testing at age when nearly eight years old. These two children illustrate graphically the difference between a potentially feeble-minded child and one who now seems to be potentially normal.

It would be erroneous to attempt a direct comparison of the change in the intelligence quotients of all of these children. Some of them have been studied far longer than the rest and have had far more chance to show latent retardation. One child has gained one point on his I Q, all of the rest have lost, the loss ranging from 3 to 31 points. If these changes be evaluated on the basis of probable loss per year (and this is an arbitrary procedure, for we have no means of knowing whether the loss is regular) the variation ranges from almost no change to at least nine points of change in one year. This must undoubtedly be individual variation and cannot be due to the arbitrariness of the scale. If those who slow up on the scale are to be counted as having done so because of test difficulty, then those who have kept I Q's which are practically constant have in reality become precocious, the original grouping by the tests is still non-prognostic. Following is a comparison of the mental status of these children upon their first examination and now, together with Stanford I Q's made at the time of the last examination.

	First observation				Last observation			
	Chron.	Mental			Chron.	Mental		Stanf.
Name	Age	Age	I. Q.		Age	Age	I. Q.	I. Q.
Daisy	7..0	7.2	103	(90)	7..7	7.4	97	97
James	7..6	7.6	101		12..1	10.4	85	92
Redman	7..9	7.6	98		10..4	10.2	99	91
Wharton	7..10	7.8	99		10..3	9.8	96	98
Harter	7..11	7.4	93	(88)	9..2	8.0	87	79
David	7..5	7.2	97		11..5	8.2	70	68
Charles	7..5	7.6	102		10..11	7.8	71	67
Helen	7..1	6.8	96	(86)	8..8	7.8	90	83
Ruby	7..4	7.2	98		10..3	7.6	74	68
John	7..6	7.2	96		10..0	8.6	86	82
Michael	7..7	7.2	97		12..2	9.0	74	63
Grace	7..10	7.6	97		8..10	8.0	91	87
Philip	7..10	7.8	99		10..0	8.2	82	75
Norman	7..0	6.8	97	(86)	7..11	7.4	94	78
Baron	7..3	7.4	102	(99)	7..4	7.0	96	90

In several of the cases the Stanford was given the first time they were examined. The I Q's for these examinations are given in parentheses beside the other findings from the same examination.

Some of these children have not settled themselves definitely into one category or another but there is not a "straight" normal or a dull normal among them. The observation of these children has proven conclusively to the writer that it is as impossible to prognose from one test the line of development to be expected from an atypical normal-testing child as it is to determine the direction of a straight line from one point. The truth of this statement may become more evident if we study some of the children individually.

Daisy has been under observation only seven months. She is "in process of prognosis." She tests practically normal, that is, at age, is responsive, over imaginative and interpretative and gives a good impression because of her readiness to talk. She is unanimously reported, however, as the "silliest thing imaginable." She seems to spend most of her time giggling or contriving to act silly, no matter what the situation. She tries to dominate the other children and succeeds fairly well although she is not especially liked because of her bullying. She steals, lies, masturbates, exposes herself, enjoys obscene expressions and stories that are far from nice. She is easily excited and is quite passionate. She learns fairly well under various sorts of instructors, but not so well as one would expect from a child who is as mentally active as she seems to be. By supplementary psychological tests she seems to have coordination average for eight year old development, but she is very poor in even imitative learning and almost non-adaptive to very simple situations. She learns very slowly on conditioned reflexes, unlearns and modifies her reaction too quickly and re-adapts very slowly. This relation of processes is that usually found in psychopathic children (10). Taking into account that her father was alcoholic and a sex offender, while her mother is sexually promiscuous, there seems to be sufficient grounds for doubting her ability to become a normal-subsisting adult. She may be a high-grade feeble-minded girl or she may develop an actual insanity but so far one can not say what will happen.

James has almost reached the point where his actual mental development will show no possibility of his being feeble-minded, but he is not "normal" despite his mental age. His father reports that he has "always been peculiar." He had convulsions up to the age of four and never learned to walk until about that time. His use of speech was also delayed. He had violent temper spells from the time he was a baby until the age of seven. Since that time he has been under institutional supervision and has been getting along well, although he was very slow in learning until last fall. About that time he suddenly seemed to wake up, did much better school work, was a leader in gymnasium, and showed his reliability in shop work, too. At that time he was 11½ years old and tested 10 years on the Goddard Binet and 8 years 8 months on the Stanford, with I Q's respectively 87 and 75. Today he tests 10.4 on the Goddard Binet (I Q 85) and has reached a part of the scale where only minimum progress can be made. On the Stanford he tests 11 years 2 months with an I Q of 92. Both examinations were made by the same examiner and there is no question of the actual change. James himself says he knows more and he proves it on all of the supplementary tests, jumping from trial and success procedures to the reasoning and deliberate methods which we expect only from adults. However, he does not seem normal. He often has dull days when he complains of headache and pain, says he cannot sleep at night and one notes that even at playtime, on those days, he will sit still, simply watching the other children. Between these attacks he is merry, alert, inventive in games, eager to do anything suggested to him. Here again the diagnostic level of the tests is non-prognostic but leaves one wondering what the next two or three years will bring of epilepsy or a psychic equivalent, improving mentality, retardation or degeneracy.

Redman, too, is a case so far unsettled. He tests just about normal and has, ever since he was first examined. He comes from a neuropathic family. His father is alcoholic, dishonest, unreliable, and deserted the family. The father's relatives all seem reputable and highly intelligent. The mother is seemingly an earnest, responsible woman. The other children all got along well under the home conditions but Redman became unmanageable about the age of two years. Later he stole, lied, could learn in school but could not be kept there because he was cruel to little girls, thumped them unmercifully and without reason, was obscene in his tendencies and in general a problem. A younger brother was a Mongolian idiot.

With changed environment Redman does well, learns well in school, is quiet, well-behaved, an attractive, normal-appearing and lovable little boy, although normally curious and mischievous. He is rapidly aproaching such a mentality that there can be no possible thought of his being feeble-minded. He is, undoubtedly, of a neuropathic predisposition and needs the best of external conditions to keep him functioning in a normal fashion.

Baron has been under observation less time than any of the others in this group. When first examined he was 7 years and 3 months old and tested 7.4 on the Goddard Binet, 7 years 2 months on the Stanford, with I Q's of 102 and 99 respectively. He came to us with a history of cruelty to other children, of killing animals for the joy of it, of destructiveness with toys and clothing. He is absolutely fearless and " likes blood." He cannot be made to obey either at home or away from it. When one finds in his family history the fact that both his father and his paternal grandfather have suffered from Hebraische Krankheit, or a progressive gangrene of the lower extremities, it puts even a graver aspect on the situation. Baron, himself, already gives evidences of neural disturbance. He is decidedly lacking in motor control, has delayed reactions, a definite nystagmus, cannot hop on one foot, staggers in walking, etc., but his reflexes are normal. He has been absolutely unable to learn anything in school except counting and the spelling of a few words like *the* and *you*. When asked to read a sentence such as *Come and see me,* he reads " Rain go away, come to me another time," applying the verses he has learned in rote fashion regardless of the text. He can print his first name and says he can write. He does this by writing I C U and reading it " I see you."

When re-examined a month after this first observation, under even more favorable laboratory conditions, he fails to do even as well as the first time, although his previous acquaintance with the tests should have been a help to him. This time he tests 7.0 by the Goddard Binet and only 6 years 8 months by the Stanford, I Q's 96 and 90 respectively. Nor is the difference due to a different evaluation of similar responses but there is a distinct difference in the quality of the work done. Both examinations were made by the same examiner in the same laboratory with the child rested and happy. The first examination was made after a comparatively long railroad journey. Baron fails the second time on the definitions in terms better than use, although this was done very well the first time. He also regresses on the knowledge of left and right parts of his body and misses the esthetic comparisons. He failed to draw a diamond when first seen but does even more poorly this time. He fails this second time to do the Foal and Mare puzzle, makes more errors on the Seguin formboard and is very irregular in the use of the pegboard, his speed on various rows of pegs varying from 16″to 32″. There is no definite relation between the increased time and fatigue.

It is far too soon to say that this boy has reached his mental limit and is showing a degenerative tendency. However, the history of anti-social reactions, inability to learn in school, the hereditary neural disturbances, together with the indications of abnormality found in studying the child himself are sufficient to justify a diagnosis of "not normal." Baron is probably showing the early and evolutionary stages of a degenerative process which is affecting him earlier and more vitally than it did his forebears. Just what may happen we cannot as yet say. Prognosis must be deferred.

One other case out of this group needs individual consideration. Wharton has been under observation at intervals for two and a half years. He has all along tested very near the average for his age on both the Goddard Binet and, recently, the Stanford. He is small and always has been frail, taking every disease that appears in the neighborhood. He was slow in learning to walk and did not seem to have the strength to get around. He is of unknown parentage, although it is said his parents were of good families. He is an illegitimate child. From the time he was a tiny baby he has had a very good home. At the age of three he was reported as bright and lively but very untidy. This report is repeated again and again through his history. He is also said to masturbate, to tell lies, to be unreliable, listless, heedless, lazy, bright and getting along well in school, but dull and irresponsive at times. No punishment seems to affect him at all. However, the most persistent difficulty was the untidiness of personal habits, that is, the constant enuresis and frequent soiling of his clothes and bed.

This habit was broken twice for definite periods, once at the age of seven when he was tried in another home and again at the age of eight when he was taken away for several months. The first time he was not at all better while he was away and he was treated very much less sympathetically than at his regular home. The change came upon his return to his regular home, he tried hard, seemed to appreciate what was done for him and was really clean for several months, then the old habits re-appeared. The second time he was away from home for five months and he gave no difficulty in any way during the time. Indeed, it seemed hard to believe that the reports made could be of the same child. When he was returned to his regular boarding home he was clean for eight months and then the old bad habits returned. Finally he became such a problem that he was admitted to Waverley for observation. From the first there was absolutely no symptom of any such untidiness, and yet there is no doubt of the accuracy of the earlier history. Nor has the habit returned since the child left Waverley, being placed in a new home where there could be no association with the earlier environment either mentally or actually. To the writer this history is the straight story of the persistence, in a rather neuropathic make-up, of a pathologically conditioned reflex. The initial incident cannot be traced. It may have been simply the over-emphasis laid upon his failure to form cleanly habits by the age of three, for there is no mention of this as a difficulty before that, although he had been in the same home since nine months of age. His slowness to learn this may have been due to his poor, sickly body. We cannot say. But there is no doubt but that a scolding woman, over-conscientious emphasizing of the child's fault, plus morbid self-consciousness of it may just have associated contrariwise, producing the bad and not the good habit. The conditioning of this might then gradually extend until the whole homesetting was associately involved. Change to an entirely different environment breaks down the habit which re-appears only after re-association with the old stimuli. This interpretation seems to be even more fully justified when we find that the child has always been cleanly in school and is so at home for a time, if very sharp punishment is used.

Wharton is a bright, lovable little boy, quaint in conversation, gossipy and preferring adult to child companions. He does well on all auxiliary tests, learns readily, adapts rather poorly, has good motor control, is rather over-tense, eager to do things, and gives no indications of lazy or dull spells. We feel that a new chance and careful training may do much to bring this boy back to an approximately normal childhood, although he is handicapped by a poor physique (merely frail, no actual physical abnormality) and a neuropathic instability. He is by no means psychopathic.

The other ten children of this group are surely feeble-minded. The I Q's by the Goddard Binet would not now be diagnostic on more than four of them if we used I Q 80 as a criterion. They would be diagnostic on seven if we use 90 as the diagnostic ratio. Five of the children now have an I Q of less than 76 on the Stanford and two others are less than 80. Yet, despite the high rating of the rest, corroborative data from other lines of observation and investigation make all who work with these children *know* that the whole ten are feeble-minded. Retardation to the point of Primer work in school, sinking to their level in an institution group of similar grade with no attempt at leadership in either games or mischief, inferiority on supplementary tests in the laboratory, all confirm the feeling of those who work with them that these are undoubtedly feeble-minded children.

The first psychological examination of these children does not show any distinctive distribution of tests done. Nine of the fifteen children are right up to grade with a basal year of seven, and no lapses below that age. Four have a basal year of six and the other two go back to five. Those who have a basal year of six all fail to draw a diamond but that is the only common failure.

The histories given in the ten cases, which are not reported individually, are fully as indicative, as those given above, of something wrong somewhere. Only one of the children was considered bright in school, while five were reported as definitely below grade. In two defect was noticed in early infancy, in the other eight at from four to six years of age. Three of them lie, five steal, seven masturbate and one attacks other children sexually. Four are cruel to children and two are cruel to animals to the extent of putting cats on hot stoves, killing chickens by throwing them to dogs to see them try to get away, etc. At least three of them are pyromaniacs, eight of them are passionate and have temper spells, seven of them are destructive. In several cases the parentage is unknown but the rest are weighed down by a history of alcoholism, immorality, a little insanity, general inferiority but not feeble-mindedness, and three of them are illegitimate.

The mere statement of these facts is enough to show that this group of children is far from an average or normal group of seven year olds. It is to be noted, first of all, that they are a group who were so much worse than other children with whom they associated that they were brought for clinical study. This does not interfere with the fact that they were all children who at one time tested " at age," with consequent intelligence quotients lying well within the at age range. The error comes in assuming " at age " to mean " normal." Testing at age is a diagnostic phrase; it merely means that *on these tests* this child is able to do all anyone may expect of a child of his age. Testing normal may mean the same thing but we are too apt to interpret into that phrase the conclusion that the person who tests normal is a normal person, and then comes the more hazardous deduction, that he is going to keep on developing as a normal person.

RELATION OF MENTAL AGE TO ACTUAL AGE

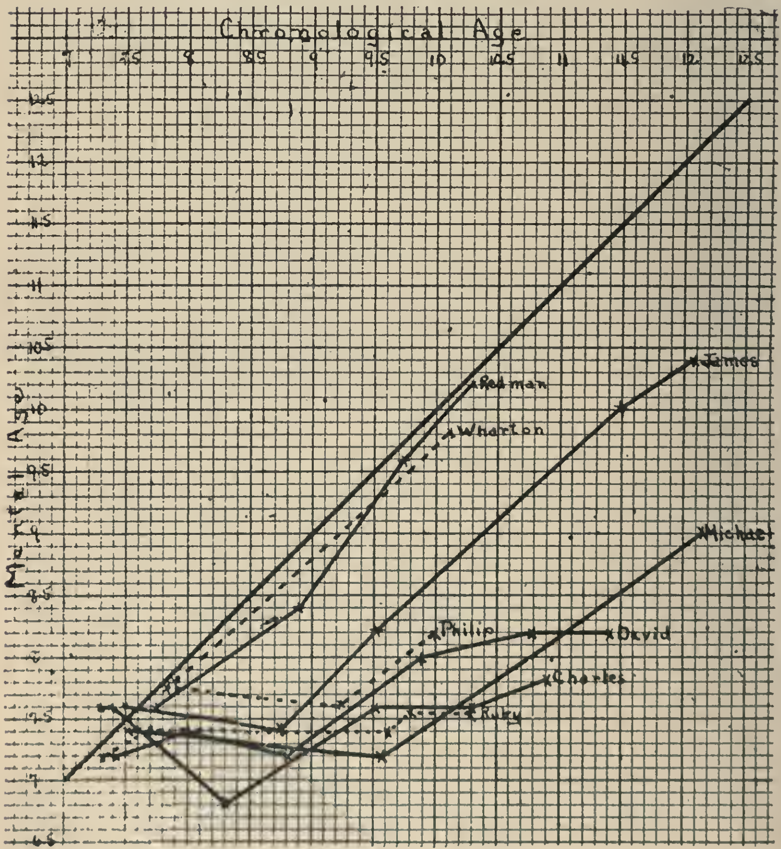

CHART I

The original test gave us a diagnosis of present mental level, pointed out just where the child was at that time; but making inferences regarding future growth is prognosis and our tests have not been standardized in a manner that enables us to use them for that purpose. This one group of cases is enough to prove that.

It is also self-evident that I Q's do not remain constant. In the five cases studied recently enough to have Stanford ratings on several examinations the I Q's change both ways, up and down. Up seven points in seven months in our problem case, Daisy, down nine points in a month on Baron, up seventeen points in less than a year on James and down three to nine points in a year with the definitely feeble-minded children.

The curves on Chart I show the mental development of several of the children and may make the data already presented clearer. The progress of a theoretically average child who maintains an I Q of 100 is represented by the uncurving diagonal. The other curves are all those of children discussed in this article.

Nor are these children who test at age and then show a sudden lack of further development to be found at only one mental age. They may not be as frequent at other ages and this relative frequency itself raises a lot of interesting speculations as to the phylogenetic significance of such cases. Following are a few brief resumés which will illustrate the potentially feeble-minded as they appear at other levels.

Anne, 5 years 6 months old, mental age by the Goddard Binet 5.2, I Q 95, when first seen, is now 8 years 11 months old and tests 7.6, I Q 85. Her present Stanford rating is 6 years 8 months, I Q 75. This little girl began giving trouble when she was five years old. She would not mind at all. She is an illegitimate child whose mother died when she was born. The child was raised by her grandmother and was so nervous that her grandmother finally could not stand having her around. Even the parochial school refused to keep her after a brief trial. She is still very nervous, although not actually choreic, is quarrelsome, cannot get on with other children either in work or play. She is very defective in learning and in inhibition according to the conditioned reflexes. She is also poor in performance tests and she cannot learn in school. None of those who work with her question her feeble-mindedness.

Karl is an unusually good example of the potential feeble-minded child, although he is not an uncomplicated case. When 9 years 10 months old he tested 10.4 on the Goddard Binet, I Q 106. At 10 years 5 months he tested 10.0, I Q 96, at 12 years 4 months he tested 11.0, I Q 87 and at 13 years exactly the same I Q being 85. One might suppose that some of his apparent retardation is due to the scale but he does no better on the Stanford. At 12 years 4 months he scored 10 years 6 months with an I Q of 85, while at 13 years he scored only 10 years 8 months, I Q 82. In most ways Karl seems to have about reached his limit. He has always had the best possible kind of a home and the most loving of care from his adopted mother. He began when he was only two years old, with screaming spells which happened frequently and without cause. These spells gradually resolved themselves into fugues into which he would pass at any time and in which he would run away and be gone sometimes days at a time, indeed, until found. He stole, lied about what he did when running away, never seemed to remember any of the things that had actually happened, and gradually became impossible to handle because of the frequency of these spells and the worry they caused. He is the illegitimate child of a feeble-minded girl whose mother was probably an epileptic. The maternal uncle of Karl was undoubtedly very like him, with similar wandering spells, indeed, he was killed by a train when running away when ten years old. The father of Karl is a hydrocephalic, excessively alcoholic bartender. The man's father and mother were both alcoholic to the extreme and one of his brothers is "paralyzed." Karl does not run away now but he has equivalent attacks in which he cries, is stubborn, and uses profane language. He has evidently inherited all of the peculiarities of the two families for he is also slightly hydrocephalic. Karl has enough mentality probably to get along out in the world were it not for these complications of the actual inferiority; but with a feeble-minded background for a psychic epilepsy with its consequent instability he is a typical institutional case and despite his original grading by mental tests needs constant provision and supervision.

One more case will suffice to show the potential defective. Ralph tested 8.2 when he was 8 years 11 months old, I Q 92. When he was 10 years 2 months old he tested 8.6 years, I Q 84. He was also tested twice by the Stanford Binet, his mental age both times being 7 years 4 months, I Q's being 82 and 72 respectively. This boy is delinquent, has a mania for lighting matches and setting fires. He is also cruel to other children. There is no doubt but that he has already reached his mental limit. He is not a straight feeble-minded child, however, but shows such marked aberrational tendencies that we are justified in calling him a psychopathic defective.

This case illustrates also the change in Stanford I Q as well as in that obtained by the Goddard scale. The various scattered references to the Stanford fluctuation which have been made here and there through this article will have to suffice as evidence for the present. The scale is too new to allow the presentation of prolonged case studies in terms of it at this time. Nor can we settle the relative frequency of such change. It does occur, however, and in all sorts of cases, on all parts of the scale. We have at present under observation as out-patients from the Waverley Clinic eight children who test at age by the Stanford but whom we feel to be feeble-minded. Only careful following of these cases for a couple of years will tell whether this feeling, based upon clinical experience, or a mental age, based upon averages, is right.

There are, of course, atypical children whose mental age improves at such a rate that they have constant I Q's. For instance,

Jane tested 5 years at the age of 6 years 4 months, I Q 79.
5.2 years at the age of 6 years 7 months, I Q 79.
7.4 years at the age of 9 years 4 months, I Q 79.

However, it is impossible to say that she will maintain the same I Q for even another year. Ernest illustrates this same stabilized I Q in an older, very feeble-minded child. He was examined when just 12, then when 14, and again when 16 years old. His various test scores were 7.2, 8.4, 9.6 years, the I Q remaining 60.

On the other hand, George, who was far more favorable, according to tests and I Q when first examined and who would impress any stranger as potentially better than Ernest develops as follows:

Mental age..........	8.2	9.2	9.2	9.4	9.2
Chron. Age	11–8	12–3	12–10	14–1	14–11
I Q	70	75	72	66	61

His present mental age by the Stanford is 9 years 1 month, I Q 61.

It does not seem worth while to take up separately the findings on the Point Scale coefficient. It fluctuates in similar fashion to the other ratios, and Yerkes acknowledges this. Defective children frequently have C. I. A's. which are far above eighty and which sometimes reach a hundred in a feeble-minded child of the verbalist type. We have two groups of coefficients on the fifteen children reported in detail above. The coefficients for the five who are still unprognosed are as follows:

1917......................	—	87	75	91	94
1918......................	95	91	92	86	87

The coefficients for the ten who are now definitely classified feeble-minded are:

1917....	89	68	87	67	83	71	86	72	74	88
1918....	72	71	89	56	81	86	83	66	68	79

Another difficulty which is too little recognized comes when the mental age or the intelligence quotient is the basis of a differential diagnosis without sufficient supplementary evidence. Pearl is 19 years old and tests 6.2 by the Goddard and 5 years 4 months by the Stanford scale. She is a little slow reacting and shy but this does not interfere with her going through the tests in a fairly satisfactory manner. According to I Q she would undoubtedly be rated by an amateur as imbecilic. Indeed it was as such that she was committed to Waverley. A single conversation with her would be sufficient to assure any one at all acquainted with such cases that she was a dementia praecox. The quality of the things she did and said indicated remnants of a higher mental ability than even morons usually attain. Yet neither a mental age nor an I Q can tell us when we have feeble-mindedness or a case such as this.

There is one other type of child, known to the writer, who fluctuates unusually on mental age scales and consequently on any ratio system. A number of these cases have been at Waverley in the last couple of years coming usually as observation cases. The members of the group are very similar, though, and the description of one of our most extreme cases will give the clinical concept of them all.

Riggi came for observation when 13 years 4 months old. He seemed well-developed and nourished and was in good health. He had been under State care for nearly seven years as his father was alcoholic and had neglected the family until they were half starved. Riggi is the fifth of seven children, all getting along well except the next younger girl who is slow in school. About the age of ten Riggi began to give trouble. He was untruthful, masturbated, became very unclean in his habits, lied about things in his foster home, saying he was not fed well, etc. He was then placed in a new home and did well for about three months. Then again, he began "doing queer things." He planned to kill all of the people in the house, became bestial, tried every possible experiment with medicine and food, intermingling these experiments with scatological rites. He started fires eight times, tried to mutilate animals, tasted such things as arsenate of lead, Paris green, carbolic acid, bluing, benzoin, gunpowder. Took to pieces everything he could lay his hands on from the water-pipes to the phonograph and telephone. He tried to make the boarding woman's little boy eat a caustic pencil. He stole cream, eggs, and food of every sort, in such quantities that he could not have eaten it all. He killed two calves by abuse and poison. He also killed thirteen hens and he killed the cat by cutting his tail off and then poisoning him. He lapped the animal's blood from the butcher knife with which he had cut it. He tried to kill the wee baby by putting carbolic acid into the nursing bottle. These details are only an abstract indicating the various directions of his activity.

When admitted to Waverley he tested 11.2 by the Goddard Binet with an I Q of 84. By the Stanford Binet (re-estimated from the Kuhlmann-Terman) he scored 11 years 6 months, I Q 86. He quieted down at once, showed no signs of any abnormality of interest, was rather dull, slow reacting, phlegmatic, kind and well-behaved. When 13 years 10 months old he seemed to brighten up, and upon re-examination he scored 12 years 5 months by the Stanford, I Q 89. This improvement continued. He showed great interest in reading, did well in all sorts of work, took leading parts in complicated entertainments and was generally liked and helpful. When 14 years 8 months old he was again examined and scored 14 years 7 months on the Stanford, I Q 99. This is evidently a definite mental change and could not be due to his having done tests he was not tried on before, for at each examination he was carried through every test, even at the superior adult level. The difference was marked in every detail of his work. He reacted promptly, concentrated on the task in hand, and gave answers rich in detail. He improved similarly on performance tests and changed on the Kent-Rosanoff association test from a low value, delayed type of response, with many individual responses, to reactions of a type which places him very near the norms for boys of his age.

At this time he was sent out again and placed carefully by the State visitor. He has now been out nine months and a report made just recently, by his visitor, says he is getting along well and has shown no aberrant traits in the whole time.

The history of this boy before he came under observation is an extreme one, but his behavior on mental tests is typical of a large number of cases. Some disturbing factor brings to a rather unstable, or psychopathic, personality a stress which it cannot stand. There may be as a result erratic behavior, merely a confusional state or a combination of the two. These reactions can usually be identified as exaggerated forms of tendencies present before the period of stress. A mental examination at the disturbed period may even throw the person into the feeble-minded group, so far as level and I Q are concerned. In some cases the situation may clear up in a few months, in others it may take a prolonged period of study before the better side of the person's ability shows itself. Quiet, regular living and wholesome food and work re-enforce the normal traits and subdue the others. Little by little, actual improvement occurs in work, in social reactions, and in test results. The fallacy of settling such a case by one examination is apparent. Even a year's study is not enough to give prognosis. Whether Riggi and his temperamental brothers will, once recovered, stay normal-functioning or will later pass through other cycles of disturbance, whether these cycles will show themselves as actual insanity, whether the early delinquencies are manifestations of such insanity are questions which can be settled only by continued observation of the individuals themselves. A single mental age or an intelligence ratio is impotent.

Conclusions

Mental ratios as an expression of a person's intellectual ability compared with the average ability of others of his age are, in most instances, a device proposed as an aid in diagnosis.

They are diagnostic of mental status only when used in connection with the actual mental age, the actual chronological age, and evidence gathered from other fields of inquiry.

They have, on insufficient data, been taken as constant for the individual over his developmental period, to the age of 14 or 16.

Because of this assumption, they have been used prognostically in an entirely unwarranted fashion.

The I Q or C. I. A. of the individual feeble-minded child is sometimes not in the least a factor differentiating him from normal children of his age.

His I Q may decrease steadily through even the earlier years of childhood, it may stand still, it may even temporarily increase.

Even an I Q of 75 or 70 or 60 need not mean feeble-mindedness. It may mean a dementia, either in the sense of insanity or of other deteriorating neural condition, as for instance a juvenile paresis.

Because of this neither an I Q nor a mental age per se can be taken as a basis for a differential diagnosis, save in most marked cases.

The situation is still farther complicated by the fact that children with comparatively low mental ratings sometimes show an unexpected mental resiliency and rebound towards average endowment in surprising fashion, making up most or all of their lost standing.

In consideration of these varying possibilities it seems only right to insist that a single I Q or the findings from a brief examination be used cautiously as a basis for anything more than a statement of present mental level, *unless* they are used correlatively with a complete survey of the child from the standpoint of his social, moral, and educational behavior and his environmental, physical and hereditary handicaps.

There is something more significant than mere mental age or years of retardation, a something we seem to have missed in our numerically finished clinical studies. At two an idiot, an imbecile, a moron and a normal may all seem practically the same. Then the idiot drops out of the race, stays at that level. Somewhere, in the next four or five years the imbecile falls behind, but the moron may be even ten or eleven before he evidences any real deficiency on our present systems of tests, Yet the difference has been there all along. The moron was as feeble-minded, potentially, at the age of two, as at twelve. The normal child was as surely normal. There is an innate difference hard to describe but all who know defective and normal children often recognize this qualitative difference before any quantitative test has demonstrated its presence. It seems as though with some the evolutionary nisus has spent itself with the effort necessary to bring into being, with others there is no energy there to meet the demand for speech, with others concrete stimuli can evoke satisfactory responses but there is not enough motive power to meet the demand for response to the faint stimulations made by abstract ideas, theories, principles, etc. But the normal child is entirely different. He lives only as an incarnation of activity, he is activity, innate, flooding, spilling with every new stimulus, responding with growth to every new demand made upon him.

Because of this obvious difference we may hope for the time when even our test principles will have so embodied these same differences that test results will be more definitely and differentially diagnostic and prognostic. We may then hope to detect possibilities and inabilities in the earlier years of childhood and do more preventive, less corrective work. But even then let us hope that it will be the study of the individual and not the mathematical application of a statistical probability upon which will be based the humanity of treatment accorded him.

BIBLIOGRAPHY

1. BINET, ALFRED, and TH. SIMON. The development of intelligence in children. Translated by Eliz. S. Kite. Publications of the Training School at Vineland, no. 11, May, 1916. Williams & Wilkins Co., Balto. 1916. 336 p.
2. DOLL, E. A. A case report of potential feeble-mindedness. *Tr. Sch. Bull.*, Nov., 1916, Vol. 13, no. 6, pp. 159-163.
3. —— ——. Clinical studies in feeble-mindedness. Badger, Boston, 1917. 232 p.
4. —— ——. Preliminary note on the diagnosis of potential feeble-mindedness. *Tr. Sch. Bull.*, May, 1916, Vol. 13, no. 3, pp. 54-61.

5. Goddard, Henry H. The Binet measuring scale of intelligence. What it is and how it is to be used. *Tr. Sch. Bull.*, Oct., 1914, Vol. 11, no. 6, pp. 86-91.
6. —— ——. The improvability of feeble-minded children. *Jour. of Psycho-Asthenics*, June, 1913, Vol. 17, no. 4, pp. 121-126.
7. —— ——. Two thousand normal children measured by the Binet measuring scale of intelligence. *Ped. Sem.*, June, 1911, Vol. 18, pp. 232-259.
8. Haines, Thomas H. Relative values of Point Scale and Year Scale measurements of one thousand minor delinquents. *Jour. of Exper. Psych.*, Feb., 1916, Vol. 1, no. 1, pp. 51-82.
9. Kuhlmann, Fred. Degree of mental deficiency in children as expressed by the relation of age to mental age. *Jour. of Psycho-Asthenics*, 1913, Vol. 17, pp. 132-143.
10. Mateer, Florence. Child Behavior: A critical and experimental study of young children by the method of conditioned reflexes. Badger, Boston, 1918. 239 p.
11. Otis, Arthur S. A criticism of the Yerkes-Bridges point scale, with alternative suggestions. *Jour. of Ed. Psych.*, Mar., 1917, Vol. 8, no. 3, pp. 129-150.
12. Stern, William. The psychological methods of testing intelligence. Translated by G. M. Whipple. *Ed. Psych. Mono.*, no. 13. Warwick & York, Balto., 1914. 160 p.
13. Terman, Lewis M. The measurement of intelligence. An explanation of and a complete guide for the use of the Stanford revision and extension of the Binet-Simon intelligence scale. Houghton Mifflin Co., Boston, 1916. 362 p.
14. —— ——, and others. The Stanford revision and extension of the Binet-Simon scale for measuring intelligence. *Ed. Psy. Mon.*, no. 18. Warwick & York, Balto., 1917. 179 p.
15. —— ——, and others. The Stanford revision of the Binet-Simon scale and some results from its application to 1,000 non-selected children. *Jour. of Ed. Psych.*, Nov., 1915, Vol. 6, no. 9, pp. 551-562.
16. Wallin, J. E. Wallace. Problems of subnormality. World Book Co., Yonkers-on-Hudson, N. Y., 1917. 485 p.
17 Yerkes, Robert M. and Louise Wood. Methods of expressing results of measurements of intelligence: coefficient of intelligence. *Jour. of Ed. Psych.*, Dec., 1916, Vol. 7, no. 10, pp. 593-606.

THE RITES OF EDUCATION: PRIMITIVE AND ADVANCED

By Lieutenant Wilson D. Wallis, Camp Lee, Va.

The savage is so intent on being practical that he makes of himself one of the least practical of creatures. He is so intent on his own limited sphere of life and activities that he has no perspective from which to view his world and never understands his own life and his own activities. This does not decrease his confidence in his system of values which he embraces but rather enhances it; for confidence is destroyed only when the light of a larger world has penetrated and cast its glow over things new as well as things old, leaving their comparative magnitude open to observation. To the extent that savagery has encased itself in its own activities, life, and ready-made formulas, it is safely insulated but woefully isolated. It will allow little to go from itself into the larger world and correspondingly little of this larger world will filter in to it.

There is this same disposition in civilized society. The barriers may be less, the insulation may be thinner, but it is there, encasing the nation in its thin or thick covering of self-confidence, prejudice, and arrogance. The difference is a difference of degree rather than of kind.

The savage has worked out for himself what is, from his point of view, a thorough system of education. It leaves no nook nor cranny of his social, industrial, moral, and religious life unprovided for. This life has more ramifications, is richer in content, than the layman is prone to think; it takes a rare and assiduous civilized scholar to probe it and none, so far as I am aware, has ever professed mastery of its intricacies, though not a few have devoted themselves to this task.

A system of education which takes care of this life cannot, of course, be easily understood nor comprehensively outlined in a few paragraphs; suffice it to mention a few of the more important phases of savage education. Since our educational systems reflect similar methods, the question of comparative value is involved. Either savage education is well advanced or our own is still primitive.

The savage, to be sure, does not reflect upon many of the processes of education which he employs, but this impairs neither their actuality nor their effectiveness. Whether he reflects upon his distinctions or not, he recognizes clearly two classes: things that are and things that ought to be. The process of welding things that are into things that ought to be is education, whether there is or is not a socially sanctioned way of doing this.

The end is, of course, the important thing. But since the savage must devote most of his attention to the means in order to make them effective, there is a tendency to view the means as all-important and to forget the object served. Hence method, procedure, becomes all-important and that to which they induce is forgotten. Thus the value of his educational procedures degenerates rapidly because the plastic means soon harden into certain procedures which he performs for their own sakes, and these procedures become fixed and inflexible.

Wherefore we find him performing a great many rites in whose automatic efficacy he profoundly believes. Their purposiveness may be evident to a more discerning wisdom but the teleogy is evanescent and probably no longer clear to him. His life becomes cataloged into a certain number of stages and transitions; he is *this,* a certain procedure transforms him into *that;* another procedure into something else. Today the Australian lad is a boy living with the women and participating in their restricted pursuits; tomorrow he is initiated into the tribe, becomes a man, puts away childish things, enters upon a new sphere of activity and is under new influences. As often happens in savage life there is an abrupt transition from one status to another.

Not only is there a change in the outer environment, there is a conviction that an inner transformation has, pari passu, taken place. The lad becomes a man, the old self dies, a new one is born. The evidences of this transformation are, a new name, the right to participate in totemic, religious or ceremonial rites, to paint the face, to wear distinctive head-dress or body dress, circumcision, piercing the nose, or other adornment or mutilation. These are the signs physical and social of a step upward in the hierarchy.

The method is effective. The youth feels suddenly exalted, others accept his exaltation as a fact, and all goes smoothly, How could it fail to go smoothly? Is it not, after all, but a game devised by the tribe, and must not all go well so long as they follow the rules laid down by themselves?

But, one may ask, is not the progression a real progression, the advance in the hierarchy a real advance? Assuredly it is. But assuredly it is an advance only because it is conforming to the rules of a game of their own devising. What nobility there is in the pursuit, in the devising of such a game and such rules, is another matter. Whether the distinctions have any value except as regards the rules of the game is still another matter, and, in estimating their higher social and educative worth, the only one that counts.

Our arbitrary and senseless academic distinctions, which a keener sense of humor will some day relegate to antiquity, but to an antiquity which is, alas! our future, pervades our entire system of education, whether organized or unorganized. We leap from one stage to another, or rather, are carried from one to another by certain rites designed to bridge the abrupt transition. These *rites des passages,* or rites of transition, constitute our organized educational procedures, designed, in many cases, to carry the student ' from precipice to precipice.'

" To avoid harsh distinctions, to bridge over abrupt transitions, is always a mark of advancing civilization; but the savage, in his ignorance and fear, lamentably over-stresses distinctions and transitions." (Miss Jane Harrison, Ancient Art and Ritual, 106). But this distinction between savagery and civilization is only relatively true. We still flaunt degrees and diplomas and vari-colored gowns, in which physical and social evidences the academic world takes as keen delight as savagery in its new titles and gew-gaws acquired after passing through the prescribed rites and meriting the promised rewards. We still have our high-sounding titles and body-and head-dress to set us off from the larger vulgar world. We have made the rules of our academic game, we abide by them, and we rise according to them very much as the savage plays his game and rises in his own estimation and in the estimation of his competing fellows—indeed, very much as the savage plays and rises. Back to the life of Nature's folk, exhorted Rousseau; well we are still back to this life in many respects. Give me education, said Leibnitz, and I will change the face of Europe in a century. Europe has had its century of education but the deeper lines of her visage have not been materially altered. It is still true that to find the savage you have only to scratch the civilized man, for the whole of civilization lies like a thin gossamer over the older strain of a primitive savagery; the procedures of civilized education are but attenuated refinements of savage education.

That these *rites des passages* which have come to pervade our educational system have a certain pedagogical value is not to be doubted. They subject the candidate to a certain social or mob psychology which argues well for the solidarity of the group; they rub off the edges of individual variations and reduce all to a type; they give us a uniform product, a consciousness of kind; and all this makes for social solidarity. But perhaps for the kind of solidarity that a flock of sheep exhibits. It tends to induce a 'sheep-through-the-gapiness' type of mind. It finds no place for Nietzsche's motto that 'one requiteth a teacher badly if one remain merely a scholar.' (Thus Spake Zarathustra.)

The pedagogue may point out that these rites furnish strong psychological stimulus. They bring about, often, a heightened attention and interest, though they as frequently induce, by their mechanical monotony, a lack of attention and of interest. If the shift is sudden and severe the new angle on interests and on scholastic career may rouse a dormant mental quality or reinvigorate an old one. This furnishes some justification for the method.

None would wish to deprive educational methods of these advantages or of any other advantages. It must jealously cherish all of them. Perhaps, however, it can add to its goodly store others which are now not commonly within its ken. It need not subordinate result to method just because method is important. Method is not important except as it leads actually to some result. It need not act as if the part is larger than the whole, as if life circled about education systems and existed for their sakes. These hypotheses contrary to fact are not only ludicrous but sadly destructive of the ends for which they exist. The method must receive its cues from this larger world of life and be guided accordingly. Any hard and fast method is self-condemned; change and plasticity is the essence of life, and change and plasticity is the essence of any system that fits life.

A sense of the larger issues involved is, therefore, part of any method of education. It is, indeed, the more important part of it; not subservient to methods but rather directing them. Here, if anywhere, in attaining a knowlege of what we are about as well as in finding out what is about us, is salvation to be found. But no hard and fast method will ever discover it. In any system of education men are more important than methods.

Yet if the reader will look again at the preceding paragraphs he will find that, in spite of our boasted progress, wherever the word 'savage' has been written the word 'civilized' might be used with almost complete propriety.

THE NEW SCHOOLS IN EUROPE[1]

By A. FERRIÈRE, Blonay sur Vevey, Switzerland

The type of school described in this paper is the outcome of an urgent need. Representing as these schools do a return to a more natural and more beautiful life in fuller harmony with the legitimate needs of childhood, and a more complete preparation for life, they are incontestably in the direct line of progress as indicated by the great prophets of education.

Experience shows that satisfying the legitimate needs of mind and body, i. e. returning to nature, constitutes a more direct and effective preparation for contemporary life than that offered by the ordinary educational methods. After all, what is asked of young people just entering upon life? Knowledge no doubt, but still more experience; or failing experience, an intelligence sufficiently lively and flexible to adapt itself to the conditions of a particular task. Strength, integrity, an enterprising spirit, and endurance at work—these the New Schools intend to give to the children entrusted to them.

Character is not conferred upon a child, he is permitted to acquire it; similarly, we do not force ideas into a child's mind, we enable him to formulate them by his own efforts. Each New School is an educative medium, or rather several educative mediums combined in one, a physical, an intellectual, and a moral medium in which the child is provided with what he needs for his development by self-activity. In each of these fields the New School presents distinctive characteristics. It is situated in the open country, far from cities. From air, light, verdure, fields, woods, flowers, perfumes, and breezes, emanate health, strength, and the joy of living. It has been maintained that the child should be accustomed quite young to the life of cities where he will perhaps have to work when he is grown up. This is a mistake. If he has lived as a child the life *par excellence* of childhood, that of the fields and woods and of abundant nature, the adult will adapt himself more easily to a life even if unpleasing, forced upon him by circumstances or duty. The essential thing at the dawn of life is to learn to master oneself and to enrich oneself unceasingly with strength, energy and new knowledge. Now, no environment lends itself so completely as the open country to the practice of this art of living.

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[1] See also T. R. Croswell: L'école des Roches: a school of the twentieth century. *Ped. Sem.*, Dec., 1900, v. 7, p. 479-91.

Nevertheless the educator must be present to guard against physical exercise taking an exaggerated place. In the order of functions, the mind occupies the highest place and it is in its service that bodily energy must be acquired or conserved.

There are two primordial conditions without which no intellectual work is fruitful. One is external to the child, the other lies within him. The external condition is well recognized by all teachers but seldom realized: the young mind must be made acquainted with concrete facts, not with abstract ideas. We attempt this but inadequately, and demand at once that the child rise to abstractions. The pupil, even when he retains these abstract ideas, loses contact with the facts, forgets them, and becomes like so many others, a perfect ignoramus or a mere book worm. The child must in some sort be steeped in facts. He must not laboriously deduce a law from ten observed facts; but of the hundred or thousand facts observed, the law must arise of itself in his mind. Psychology shows moreover that up to about the age of twelve years the memory for concrete things is at its best. Never again in his life does man enjoy an equal power of assimilating the details of concrete experience. On the other hand, from 15 or 16 years of age the youth feels the need of relating facts, of comparing them, of abstracting, of establishing relations of cause to effect, not only as between one fact and another but in their universal interrelations.

These needs, differing according to age, must be satisfied. We must not, as is generally done today, impose on the child reasonings to which he is as yet indifferent. We must do away with the abuse of grammatical exercises and classifications, with all the hollow verbiage the usefulness of which he does not understand. We must not impose on the youth superhuman efforts of pure memorization, as is undeniably the case today in preparing for examinations. In vain do we say to the students: Work for your future and not for the examinations; assimilate your knowledge and do not be content merely with memorizing. The requirements are there, and their demands are such that one must be exceptionally gifted not to have to spend all one's available strength on the simple mechanical work of acquisition.

If on the contrary, the child is allowed sufficient contact with the facts, connecting them logically in just so far as he himself needs, and if the adolescent is made to think over the facts henceforth in his possession—the structure of knowledge thus acquired will be so firm, so well established, and its elements so intimately united that pure erudition, if necessary for this examination or that profession, will find a solid foundation. Experience proves it.

Moreover the satisfaction of genuine needs brings about a deeper and still more immediate result; lively interest. This is the inward condition of productive intellectual work. But how to arouse interest?—By satisfying the intellectual needs of the child. And how to recognize these needs?—By conforming to the psychological laws of intellectual evolution, and above all by observing the manifestations of such needs in the children before us. Hence the necessity for all teachers to understand thoroughly child psychology.

The intellectual setting of the New School will thus possess the following characteristics: it will tend to arouse the interest of young people for the subjects treated in their lessons, it will offer abundant means of self-instruction in the form of concrete objects, pictures, laboratory experiments and the observation of various phenomena in nature.

Intellectual education in the New Schools may be characterized in a word as a process which does not impose knowledge from without, but rather places the child in a position to discover it or, better, to create it within himself. Moral education is based upon the same principle. Instead of imposing artificial rules of conduct which run the risk of having no influence upon him or even of becoming distasteful because they hamper him and because he does not understand their significance for life, the new education expects the child to conform his outer life to an inward rule of his own volition because he has thoughtfully judged it good. In other words, our education will not impose from without a moral code upon the child. He is expected rather as a result of his experience to perceive the need for order and for good and to express this freely in activity that conforms to the general good.

Physical Education.—Dr. Lietz, the founder of the German New Schools gave them the name *Land-Erziehungs-Heime* (Home for education in the country), intending thus to indicate that the natural dwelling place of the child is the country. In these schools one finds usually a complete farm equipment, cows, horses, chickens, rabbits, bees; and there is space, plenty of space. What more is needed to make a child happy?

Life is simple, no luxury or artificial comfort. The pupils enjoy as much as possible open air. Everything that can be done out of doors is done in the open: lessons, evening lectures, and meals take place out of doors whenever the weather permits.

Each pupil spends one or two hours a day in agriculture or shop work. Manual labor makes for steady nerves and self-control; and when regular and not excessively fatiguing, it is a source of endurance and strength.

Gardening for the little ones; agriculture for the older ones; and, for all, the raising of animals of various kinds are appropriate and enjoyable activities. They are useful for the development of the body, they teach the children a thousand useful and interesting things, and develop in them practicability; moreover, while devoting themselves to these labors, the children feel that they are working for the welfare of their little community.

Wood work also is treated not as a play but as a serious branch of the school programme. As carpenters and joiners, the pupils produce useful things. They learn to make bookshelves, tables, sheds for bicycles, etc. Everything the child does must have a useful purpose, otherwise his work does not interest him. The advantages of woodwork are numerous; besides the training of the eye and the gain in skill, there is training in patience, perseverance, and self-mastery. These are the abilities and qualities which life will demand of the young man. The psycho-physiologists have shown that it is through muscular control that we learn self-control. It is confidence in one's manual strength and dexterity that engenders self-confidence for the great tasks of life.

The child needs to play. Games are as natural to him as song to the bird. They are the expression of the awakening of the body and mind and become a source of experience and a preparation for life. The child must therefore be able to play freely. But besides individual games, the child must enjoy team games. Foot-ball, particularly Rugby foot-ball, which brings every limb into action is an excellent training in courage, discipline, cooperation, and solidarity.

I do not know purer joy than winter sports. Coasting, skating, ski-ing produce an open air ecstasy difficult to explain. Is it the stinging cold, the breathless speed, the demand upon your skill, the threatening danger—danger no more serious than being engulfed in soft snow—is it all these allurements together? I know not. The fact remains that all these sports, particularly ski-ing, exercise an irresistible attraction upon those who have tried them.

But walking is in all seasons, the chief sport of the New Schools. At least every fortnight and sometimes oftener, teachers and pupils take an excursion together to a mountain top, or to some spot interesting for its beauty or its historical associations.

The pupils visit also workshops, factories, and museums of the neighboring towns. Short holidays of two or three days allow teachers and pupils to undertake longer excursions. At Easter or in July, Dr. Lietz usually organizes long cycling tours through Italy, France, Germany, England, and even to more distant lands. Where could a more interesting experience, a more effective lesson in cooperation be had than the one provided by these fairy-like trips where one sleeps under a tent and does one's own cooking?

The New School pays a great deal of attention to hygiene. A health record of each pupil is kept. He is weighed and measured at the beginning and end of each school term and is periodically examined by a physician. Physician and educator must cooperate, for most physical disturbances arise in the organism, or at least react upon it.

To sum up: if the New Schools seek the healthy development of the body, it is for the welfare of the mind. Both in physical work and in sports, the New Schools avoid all excesses, but they expect much in the way of health and especially of character building from these activities when patiently and persistently carried on.

Intellectual Education.—Let us observe first that the distinction between intellectual education and instruction, all important as it is, is often disregarded. To educate is to form the mind; to instruct is to furnish it. Is it not better to be able to use intelligently the knowledge one has acquired, even though it should be slight, than to be erudite and ineffective? As the primary object of the New Schools is to form men with clear understanding and liberated reason, they teach perhaps fewer things, but those taught are better coordinated than in most educational institutions.

It has been claimed that the pupils of the New Schools are less successful than those of the state and other ordinary schools at the examinations for degrees and official positions. That is a legend that must be destroyed. Every year the facts prove on the contrary, that pupils normally gifted and entirely educated in the New Schools usually take their maturity examinations or the baccalaureate brilliantly and astonish the examiners by their self-confidence, their presence of mind, and the thoroughness of their knowledge. Their superiority becomes only the more marked as they continue their studies at the university or take up their life work.

Should secondary education be professional or humanitarian? Both views have their convinced champions. The New School occupies an intermediary position. In its opinion either one of those tendencies, exclusively followed, would yield incomplete results. For that reason it imposes, like some American schools, a substantial nucleus of required subjects (native and foreign languages, history, geography, natural sciences, and mathematics).

Teaching in groups has many advantages. It enlivens, awakens the spirit of emulation, and encourages imitation. But it suffers from the great disadvantage of meeting fully the need of a small number only—of those of average ability. To overcome this disadvantage, the New School has two means at its disposal. One of them is the system of "movable classes," chiefly used for foreign languages and mathematics. In these classes the pupils are grouped according to their ability and not according to their age or the class to which they belong in other branches. This method of grouping is all the more important because the method used in mathematics and foreign languages is cumulative, which means that the child can understand what follows only in so far as he has assimilated what precedes. The other means is the "individual program." Each pupil has his own schedule, adapted to his needs. The advantages of these simple reforms are invaluable for the individual development of the pupils.

Continuous work is the only productive work. The scattering of the child's attention over six or seven subjects a day, each taken up for three quarters of an hour, is a fatal invention of the old type of school. Doubtless the child needs variety; he must by turns listen, act, draw, write, memorize. He must consider the same subject in a thousand different and attractive aspects. But to compel him, as is done now a days, to touch upon a number of totally different subjects in the space of a few hours, can be but a detrimental intellectual gymnastic. In many cases he needs half an hour of slightly productive work before he can begin to concentrate his attention fully upon the subject in hand. If the bell rings when he has just warmed up to it, he spends his time warming up for a lesson never continued. In the New Schools an attempt has been made to avoid the disadvantage of this constant oscillation of attention. The regulation number of hours for the year is kept up, but for several weeks the pupil studies a given subject intensively. A livelier interest, less fatigue, quicker and more lasting results are the outcome of this greater concentration.

To these reforms of schedule the New Schools add reforms of methods. In this respect they do not differ from those other schools that have broken with the old routine. In the teaching of foreign languages, for instance, the New Schools use the "direct method" which begins with the use of the spoken language, and postpones the theoretical study until after much practice. In science, the concrete facts and the pupil's experiences are taken as a basis or starting point for the deduction of abstract laws. In geography, the study of climate and products leads by logical connections to that of industries and of the racial characteristics of the inhabitants. In history, we are no longer satisfied with the memorizing of facts, names, and dates, without any logical connection. We try rather to determine the social effects of great events; we trace throughout the multiplicity of concrete facts the psychology of men, nations, and epochs. All these are without a doubt new methods, but they are not peculiar to the New Schools. The same remark can be made about the tendency to coordinate subjects, to connect, for instance, on the one hand history with geography, and on the other general history with the history of literature and of art.

It would be superfluous to give here detailed plans of study of the New Schools. They vary from country to country according to needs and interests. Better limit ourselves to a statement of general principles and practice. Put the child in contact with facts and awaken his interests. The psychology of childhood shows that nothing interests the child so much as his own activity. He finds interest in what he does or sees in the measure in which it can be of use to him. In other respects, the child is interested primarily in what affects him, and secondly in what concerns other children. To adults, he is more or less indifferent, unless they love him, care for him, and share his interests. Let the child be active. Keep him busy with work, the utility of which he realizes. In every possible instance, let him be put before the objects themselves or reproduction of them. Let him draw for himself, whenever possible, whatever he is to study, and let the teacher never weary of drawing before his pupil.[2]

There is no more fatal psychological error than the belief that the child must learn to apply himself to a painful task, meaningless to him, in order that he may learn to master himself. Effort for effort's sake, even if an ideal, can be appreciated by the adult only. It is no less than the matured fruit of a many-sided life, long accustomed to self-sacrifice. Moreover, one cannot, though it is often believed, " form the habit of effort." To be able to put forth effort in a given field, does not necessarily mean ability to do likewise in another. The fruitful effort is expressed in a habit already acquired, or sets in operation energies already in existence. The effort itself creates neither habit nor energy. It is in proportion as the child's interest is aroused that his latent energies become manifest, and that new habits become established.

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[2] See in this connection our study, *Biogenetik und Arbeitsschule; ein Program zur Ausgestaltung der Volks-Schule.* Beiträge zur Kinderforschung und Heilerziehung, Heft 101, Beyer und Söhne. Langensalza, 1912.

What avail the most improved school methods if a pupil does not learn to learn by himself? "Learn how to learn," is a precept too rarely in the mind of the teacher. In the New Schools the pupils are urged to work independently, but first they are prepared for it. The pupils that have reached the age of twelve must complete by themselves work prepared in class. Later on, instead of requiring of them only brief tasks to be performed from day to day, as is usual until the age of eighteen, longer pieces of work requiring researches in special books, are assigned. Today, a real man of science is not one who, like a living encyclopedia, remembers everything he learns. Much more is he one who, knowing at every moment where to find the information he needs, develops ideas, contributes to scientific knowledge, and exercises a fruitful activity within the limits of his profession.

Moral Education.—If it be true that education is the development of each child's potentialities for good, it is easy to deduce from that formula most of the methods which may be applied to moral education. But before speaking of methods, we must agree on the goal to be reached; this goal is indicated in our definition of education. It is neither the free expansion of all the child's tendencies, nor the forced adaptation of his nature to an external and arbitrary ideal derived from a preconceived idea of what constitutes human perfection. When we speak of training young people to become well rounded human beings, we seek no more than to lead them to concentrate their efforts upon the development of their innate tendencies, so that they may become men with true hearts and strong wills.

The most striking characteristic of the New Schools is the great freedom allowed the pupils. Their education is truly one through liberty for liberty. But by liberty we do not understand the absence of limitations imposed upon the will; we mean on the contrary the liberation of what is best in the individual, the domination of the higher over the lower tendencies of his being. That liberty cannot be conferred, it must be won. He who from childhood has felt responsibility to none but himself and duty; who at his own risks has learned to estimate the consequences of his faults and has tested the joy of victory; who being loved, has loved in his turn, and has found the opportunity to give something of his time and his heart to those with whom he lives in daily voluntary self-sacrifices—such an one. when in the grip of life, is not likely to be snatched away in the whirlwind of cheap pleasures.

The objection will perhaps be made that the child is not ready for a life of freedom. I answer that if the child were a mature person there would be no need for education. The authority of the teacher and the obedience of the child must be the points of departure of moral education. But the great mistake of present education is to continue too long education by authority. The too exclusive desire of guarding the child from all false steps deprives him of experience and thus of one of the most essential elements of education: the experience of good and evil. Present day education *imposes* habits upon the child and omits to have him *form* habits. And the youth, not knowing why the good is good and the evil evil, or knowing it only in theory, is scarcely equipped to meet the vicissitudes of life. The child must learn to obey; but besides giving orders, the far-seeing educator will early give advice, which the child may accept or reject.

The physical environment has an influence on social life and thus affects the moral education of the child. By physical environment I mean what Ellen Key calls a "beautiful setting." We all know how great is the influence of environment. How much easier it is to be good in calm, well ordered, and beautiful surroundings, than in an untidy place where whatever meets the eye, is unpleasant and repulsive. I have already spoken of the influence of the country, fields, woods, flowers; of the distant restful horizons; of silence and light. The cottages of the New Schools are pleasant and comfortable homes; in every room engravings and pictures, expressing in the language of art noble ideas, establish in the child, without his being aware of it, a taste for the good and the beautiful.

In this connection the admirable influence of music and in particular of chorus singing, must be mentioned. No other kind of work, not even the active cooperation of the fields, with its common toils and joys, awakens to the same degree the feeling of solidarity. In chorus singing we feel ourselves part of a whole. We are carried along by the whole. A similar feeling comes to the member of an orchestra. Every New School has a pupils' orchestra.

It should be remarked, however, that the influence of the physical environment, is felt only when it serves as a setting to a well organized social *milieu*. The child is even more sensitive to the moral influence of his comrades than to that of his teachers. The school spirit is either a great lever or a great obstacle, compared with which isolated punishments are of little avail. A right public spirit, like good individual habits, is the product of work, order, and discipline. To establish that discipline upon rules accepted by the pupils themselves is to have order on a safe foundation and to assure the regular work of the little school-republic.

Just as in larger states, the citizens have their rights and duties, so the young citizens of the New Schools have theirs. The many functions created for the good of the community by a rational division of labor are entrusted to those who are the most worthy of them. Each one according to his ability has a share in the preservation and progress of the miniature society of which he is a member. Not only are the pupils responsible for certain farm work and the care of animals, but the material and moral order of the house is intrusted to them. Those who give proof of faithfulness and good citizenship are appointed to positions involving extended social responsibilities. The "prefects" have, within indicated limits, the duty of calling their comrades to order and sometimes even the right of punishment. The system, applied in every New School gives excellent results. The citizens of the little school-republic prefer to be called to order by one of their comrades than by one of the teachers, and those elected to office gain a seriousness and self-possession that no other method of education could give them.

The relations between teachers and pupils are, in class as out of it, those of friendship between older and younger persons. Punishments must assume an impersonal and impartial character. If the master or the prefect is merely the executor of a law accepted by all concerned, if he acts without anger and with affection as one charged with a social duty entrusted to him by the community, if moreover he is tactful with the transgressor and immediately undertakes with him the reform which will prevent a recurrence of the trouble, the child, far from being offended, will rather esteem the more his master or his schoolfellow.

In the regulation of the child's conduct, reward should outweigh punishment, joy surpass pain. Annoyance, remorse, and sadness which decrease energy are rarely effective. Emulation is an excellent incentive to work and moral progress. To imitate others, to do as well and, if possible, better than they, are tendencies innate in every child. Consequently he should have the opportunity of comparing his work with that of his comrades; but still more frequently he should be called upon to compare his present achievement with his past performance. The realization of one's own progress is one of the liveliest kinds of encouragement. The feeling of progress achieved is both worthier and more effective than the feeling of rivalry.

The ideal goal of moral education is to make the child self-governing, free, and worthy of his freedom.

THE MENTAL DEVELOPMENT OF CHILDREN*

By G. W. A. Luckey

The nature of this meeting, the commemoration of the twenty-fifth anniversary of the national child study organization, throws one into a reminiscent mood. The coming into my home of a daughter in 1890 and of a son in 1891 turned my attention for the first time to real child study.

The following year I received my first baptism in the scientific study of children at Stanford University under the direction of the young but virile prince in that field, Professor Earl Barnes. In 1894, at Clark University, I came in touch with that living master of research in genetic psychology, the father of child study in America, the lover of truth, the children's friend whom we honor today, our own G. Stanley Hall.

Among the early prominent leaders in this new field were: Preyer, Tiedemann, Sigismund, Kussmaul, Genzmer in Germany; Darwin, Sully, Pollock, Warner in England; Taine, Perez, Eggert, Binet, Compayre in France; Hall, Dewey, Baldwin, Barnes, Miss Shinn, Mrs. Hogan in America; not to mention others whose excellent works in the early eighties and nineties did much to steady the movement. One can scarcely keep back the thought 'that if our efforts had only been stronger and our intelligence keener we might have prevented, by working together, this cruel war with all its human tragedies. Humanity is the same the world over. To know and control thyself, or, in other words, to discover God's laws and obey them, is the essence of all truth.'

Like every new movement, child study presented much of dross. Professional reputations were made and lost in a day. It was difficult to select the true from the false. Discouragements came thick and fast. The pseudo-expert who had entered the field for quick returns, left in disgust. The subject was so complex and results obtained often so meager, that many of our best students faltered. Even this organization in an unguarded moment added fuel to the criticism by changing the name of the department from Child Study to the less appropriate term Child Hygiene. But Child Study in its true sense has come to stay. Hosts of teachers are again returning to their first love, and by means of the opportunity now furnished them through graduate schools of education, they will be able to change their entire attitude and worth as teachers. There is to us all but one book, the book of nature with man its highest product and only interpreter. The true interpretation of this book gives all the truth and culture to be found in human life. Every individual has or may have the key which unlocks this sacred storehouse of all wisdom. The deeper and richer our study the more we become convinced that the essence of life and the laws of growth are the same in plant, animal, man. The study of one leads to a knowledge of all. Each is fashioned, through inheritance, to a special mould from which it cannot deviate except in the slightest degree, and then only on the juxtaposition of the greatest forces working in harmony. The common elements in all life are so numerous and so convincing that only the ignorant or mentally perverse need fail to see the relation and catch the spirit of the unity of life.

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* An address given before the National Education Association, Pittsburgh, July, 1918.

From the lowest to the highest forms of life this unity and conditioning of one by means of the other leads to faith in the plan and reverence for the truth that shall make us free. Under other circumstances I should like to call your attention to some of the beauties of the law of evolution, as manifested in the lower forms of life, indicating the value of construction and increase of life to destruction and loss of life, but another problem awaits me.

Man begins the journey of life as the plant or other animals, with a single cell. Through growth and cell-division the change is miraculously rapid at first increasing over nine-hundred-million fold during the first nine months and then increasingly slower, or about twenty fold more in the next twenty or twenty-five years. By adult life the single cell of the beginning has multiplied to represent more rather than less than four-hundred-billion cells clustered into groups and differentiated into organisms each with its special function and work to perform. Any disturbance of a single organ may be sufficient to throw the whole machinery out of gear. To illustrate, the thyroid gland, the function of which is not yet well understood, seems to secrete a food essential to higher brain growth and functioning, and also to act favorably as a remover of the toxic products of metabolism of the higher nervous system. Hence any pathological condition of the thyroid gland, as in goiter, myxedema, cretinism, is apt to be accompanied with severe mental disturbance, if not a complete nervous breakdown and feeble-mindedness. It is the clearer knowledge of this conditioning relation between the parts and functionings of the body that is bringing clearer to consciousness the vital need of the psychological clinic to the public school system. If we surround the child with a suitable environment, remove as far as possible the evil effects of parental mistakes, feed each organism—physical and psychical—when hungered and nascent, teach the individual to direct and control the lower processes of thought and action by means of the higher, nature will do the rest and we shall all be proud of the product. The living organism must fill the mould before it can change or break it; that is, all progress of civilization takes place at the top.

The individual of today represents the accumulated experiences of countless generations. At the bottom of the push for greater and better life is the will to live. It is found in all animal existence, and causes the struggle that makes for civilization. Through it the one-celled animal adds sustaining elements to all life above it. Nature's laws are eternal and cannot be broken or set aside without injury to the whole fabric. To live and act in harmony with these laws means the fulfillment of God's plan and the establishment of the greatest good and happiness to man.

Every cell or organism, whether acting alone or in group, manifests this particular individual will to live; when acting in group it takes on a new function without surrendering the old, i.e., the will to live as a member of the special group. This is the essence of all later development, whether physical or psychical, and probably represents the biological root of individualism and socialism, a dualism in all that cannot be changed without the destruction of life itself.

But passing from the early beginnings to the twentieth century man, he is, as is well known, the embodiment of all that has gone before. To every individual, through growth and development, is furnished the opportunity to pass rapidly through the conditioning experiences of all the past, and then add his bit of truth at the top for the sustaining happiness of coming generations.

Because of the rich inheritance that falls to the lot of every individual and the binding effect of the inner life upon growth and development, intellectual freedom becomes a matter of necessity for all, or their failure to advance is ours, not theirs. In this growth and living over the history of the past the individual does so on many different levels. There are three in particular, found in childhood and again repeated in adolescence, to which I desire to call your attention. From birth to twenty or possibly twenty-five the individual passes through two important life-cycles of growth each containing three distinct stages or levels of growth. The first, from birth to two or possibly three, is the emotional level when the feelings are dominant. The child is now a dermal animal. The epithelial tissue which includes not only the covering of the body but also the alimentary canal, the lungs, nervous system, etc., is making its greatest growth, and since it contains all the sensitive end-organs, it is easy to see why the feelings are now storing up a rich harvest for future use.

The second, from three to seven or eight, is the volitional level when will is dominant. The child is now a motor animal. The muscles, especially the large fundamental muscles, are passing through their most rapid growth, and require the exercise that makes of the child a dramatic or doing animal.

The third, from eight to twelve or fourteen, is the intellectual level when intelligence begins to get control and is dominant. The child is now a discriminating animal. The finer muscles are developing and demanding exercise or use. Skill of movement now takes the place of the awkwardness of former years and lays the foundation of the formal side of education essential in later years.

As is well known, all true education develops from within and cannot be hurried nor aided by dictation nor force from without. If education is the change wrought in an organ or organism through individual experience, one can see how by following in the path of the biological steps here shown and conforming our teaching to the inevitable laws of nature, we could soon create a new civilization.

True teaching consists in discovering the natural laws of human development and bringing the mental food to the child in the form and at the time in which it is needed and can be utilized. This first cycle of individual growth is known as childhood. It is selfish, individualistic, and based on physical hunger, food-getting and self-preservation.

The second cycle is known as the cycle of adolescence. It repeats in a similar order the same three levels or stages of development. A new birth occurs, the entire physical growth begins anew. The motive is sex hunger, procreation, and parental instincts. Socialism and altruism become necessary concomitants of future existence and tend to increase the individual love of life and interest in nature.

The difference in the rate of development now between the boy and girl makes it necessary in our scheme to separate them. Hence I shall proceed with the boy in mind. From fourteen to sixteen the dominant growth changes seem to be dermal affecting the epithelial tissue and producing innumerable new feelings and emotional desires. This is known as the adolescence period *par excellence* in gathering, testing, trying-out, and storing away new experiences, laying the foundation for later versatility and strength.

From sixteen to eighteen (the definiteness of these statements should not indicate that there are not many overlappings) is the second period of most rapid growth of the large fundamental muscles when the will and the desire to do are again dominant. This is the time for general training and education. The boy now delights in rivalry and feats of strength. If he is not handled right he may leave school before his time to enter the dynamic world where he can do and dare. Woe to the insipid teacher in this stage and the next; later generations must suffer for the want of a man. Today, as never before, the world needs men, truly educated men; men of clear vision and consecrated wills; men who believe in God and love His children; men who will not hesitate nor falter where truth points the way.

From eighteen to twenty or twenty-five is the period of the second rapid development of the finer or accessory muscles. This is the period *par excellence* for specialization in education, the selecting of a profession or trade and perfecting ability and worth in it; seeing, appreciating, and promulgating the finer things of life. The individual is sure to appreciate the natural order of human development and have many inclinations to follow it in the direction of a higher life and a better civilization. If he does not improve upon his inheritance it is because of a faulty environment or bad teaching and not because that God so willed it.

If you have followed me thus far I shall ask you to go with me now over another step which to my mind is the most important of all. I have been considering human development ontogenetically; I desire now to consider it phylogenetically. As the individual passes through his ontogeny by means of special steps or levels, so he lives over and develops his racial history on definite stratas or special levels, three of which must have held his forbears fixed for ages. If we now take a sweeping view of racial history and experience, we note that besides the dualism resulting from the interaction of the physical and psychical, there is the well-known trinity of the psyche-emotion, volition, intelligence. Now if we consider the larger period of human development when the feelings and emotions are dominant, and when body growth is the principal function, I think we can safely say it covers the first twenty to twenty-five years of life. Barring the stress and strain and the many struggles of altruism that appear, it is the period of selfish individualism, the perfecting of the body and of being stimulated through the fundamental feelings and emotions. It is a period of body building, egoism, and self-preparation. The chief motive is physical hunger, including the instinct of self-preservation.

From the early twenties to forty-five or fifty the whole purpose and nature of life changes. It is now actuated by sex hunger, procreation, parenthood, and the protection and care of the young. As the former life centered in the immediate interest of the individual, the development of a strong body and an energetic mind, the present life centers around the needs and immediate interests of offspring. It is to a degree social and altruistic. We begin to live for others: the family, the clan, the tribe, the race, the nation. It is the period of construction, homemaking, industry, practical sciences, lower patriotism, sectionalism, nationalism. In a broad sense it is the volitional period of life *par excellence,* when men for the sake of offspring and his immediate group executes the earlier fundamental functions of the world's work.

From fifty to seventy-five or eighty, as life is now constituted, is another vitally important period to every normal individual. It is the period of intelligence *par excellence* when the individual, who has lived in harmony with nature's plan, is free and ready to render his best service to humanity. The individual who has lived wisely, and passed normally through the other two stages, is now ready to enter efficiently and religiously upon his highest life's work. It is to the healthy individual, the period of constructive thinking, as the first was one of feeling and emotion, and the second, one of volition. The fundamental motive now is the hunger for truth, the desire to know the true purpose of life, and the will to render the greatest service to mankind. Man has now come into vital touch with his spiritual inheritance, the last great level on and through which he is permitted to live; but how worthy may be the ending and the service rendered.

Each level, no doubt, represents ages of static conditions of the race, until some fortuitous variation, more useful than others, led the race that survived to a higher level. Through these ages of struggle and push upward of our ancestors, we may move rapidly through the entire history and come again into vital touch with the essential experiences of the entire past. The latter is what is meant by true culture. To all individuals such a mission is possible and intended. If we do not live to enter upon it, or become fixed in a lower level when it was intended we should serve in a higher, the fault is ours, our parents, or our teachers, and not that of nature.

I have turned over rapidly in your presence a few pages of the book of nature, quoting at random a few of the thoughts that appeared on the surface; that I have not been able to select the best nor completely satisfy my hearers is as plain to me as it is to you. With this foundation I should like to discuss more fully the mental development of children. If you have followed me thus far, you can add the details; if you have not been able to follow me, the details themselves would be uninteresting. True intelligence can only be developed when the organism concerned is nascent and supplied with sufficient energy. Some minds are able to utilize more intellectual food than others, and there are times when all are dull. All children respond to teaching that is well directed and furnished in proper quantity and right quality. The three intellectual periods mentioned above are the ones in which the growth of intelligence should be stressed, but all levels are vital to the life of the individual and should be given sufficient food and stimulation when nascent. The three psychic elements of feeling, willing, knowing are combined in every act and so interrelated that one cannot be developed far without the other.

One fact of human development I should like to leave with you with such burning clearness that you can never forget it. The book of nature from which I have been sketching is written, through nervous complexes, impulses, traits, instincts, indellibly in the soul of every individual. The least stimulation of these latent elements when nascent and ripe will set them off. When nature becomes to you a mirror, look in; behold thyself and see God. Why any man who by controlling his own complexes and working out his own salvation might become great, should desire to force his thought and methods of thinking upon another, thus preventing the other from reaching his highest goal, is an enigma hard to understand. Teachers should avoid it and never give for truth what is not truth. Education should make men free, and not slaves.

Are you intelligent and clean? Are you blessed with a real hunger for truth? Have you been a faithful student of child-life? Do you *really love children? All children?* You are saved; go forth and save others.

STANFORD-BINET TESTS OF 112 KINDERGARTEN CHILDREN AND 77 REPEATED TESTS

IRENE CUNEO AND LEWIS M. TERMAN

PURPOSES

The purposes of this study were as follows: (1) To find the distribution of intelligence among kindergarten children: (2) to correlate the results of Stanford-Binet tests with school marks and teachers' estimates of intelligence; (3) to determine the effect of the repetition of a test upon the resulting intelligent quotient; and (4) to secure data which would throw light on the proper location of the tests in the scale.

SUBJECTS

Tests were made of 112 children, 77 of whom were tested twice. Of the 112, 49 were attending the kindergarten of the San Jose State Normal School and included the total attendance of that department. The remaining 63 were chosen at random from kindergartens in San Mateo, Cal.

As far as could be ascertained, our group of subjects may be considered fairly representative as regards social status. The large majority came from middle-class homes, a few from each extreme.

All of the 112 children were American born and the parents of all but six were of North-, Central-, or West-European descent and had been long in America. Of these six, four were Italian and two Portuguese.

The sex and age selection was accidental and resulted in the testing of 65 boys and 47 girls of the following ages:

Age	Boys	Girls	Total
3–7 to 4–0	5	4	9
4–1 to 4–6	9	7	16
4–7 to 5–0	11	9	20
5–1 to 5–6	13	13	26
5–7 to 6–0	20	11	31
6–1 to 6–6	6	2	8
6–7 to 7–0	1	1	2
Total	65	47	112

CONDITIONS

All the tests were made in a small side room, under conditions which were for the most part quite satisfactory. There were few distractions or interruptions and the children were interested in the tests. A test usually required from 30 to 40 minutes, but there was little evidence of fatigue. In all but two or three cases suitable rapport was quickly established.

In giving the tests, the directions set forth in Terman's *The Measurement of Intelligence* were adhered to strictly. The responses were recorded verbatim. The tests were all of wide enough range to include one year in which there was no failure and one year in which there was no success.[1]

The Distribution of Intelligence Quotients

The intelligence quotients found are given in Table I. This table includes only intelligence quotients resulting from first tests, those resulting from repeated tests being here ignored.

Table I. Intelligence Quotients Found

61—86— 96—102—109—113—121
72—86— 96—102—109—114—121
75—88— 96—102—109—114—122
76—90— 97—103—109—114—123
77—90— 97—103—109—114—124
79—90— 98—103—110—114—124
80—90— 98—105—110—114—125
80—91— 98—106—110—117—126
80—91— 99—106—110—117—126
80—92—100—106—111—118—129
81—93—100—107—111—119—130
82—93—100—107—112—119—130
84—93—101—107—112—120—136
85—94—101—107—113—121—142
85—94—102—108—113—121—146
85—96—102—108—113—121—152

Graph I shows the distribution of intelligence quotients plotted in the form of an ogive. Graph II shows the surface of distribution resulting when the intelligence quotients are grouped in ranges of ten: 60-69, 70-79, 80-89, etc.

The intelligence quotients range from 61 to 152. The median is 105, the lower quartile 93, the upper quartile 114. The semi-interquartile range is 10½.[2] The distribution closely approximates the normal, but the high median indicates either that the Stanford Revision is still somewhat too easy in the lower range or that the children tested are on the whole somewhat superior.

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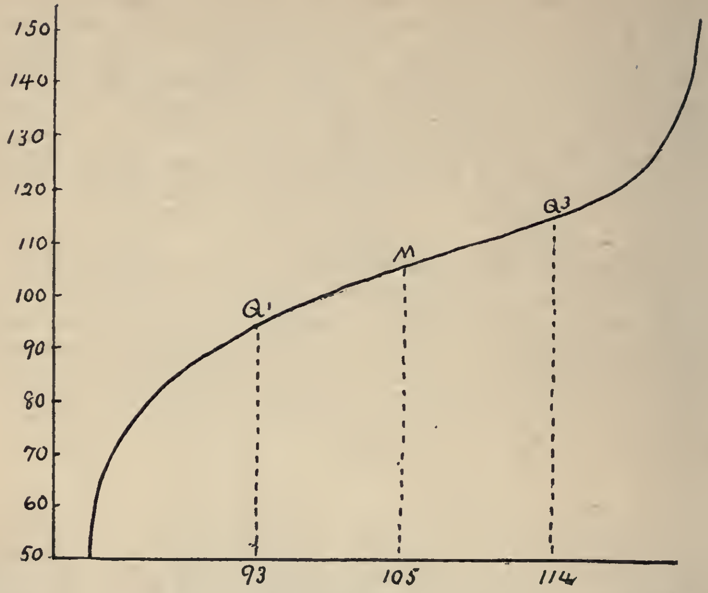
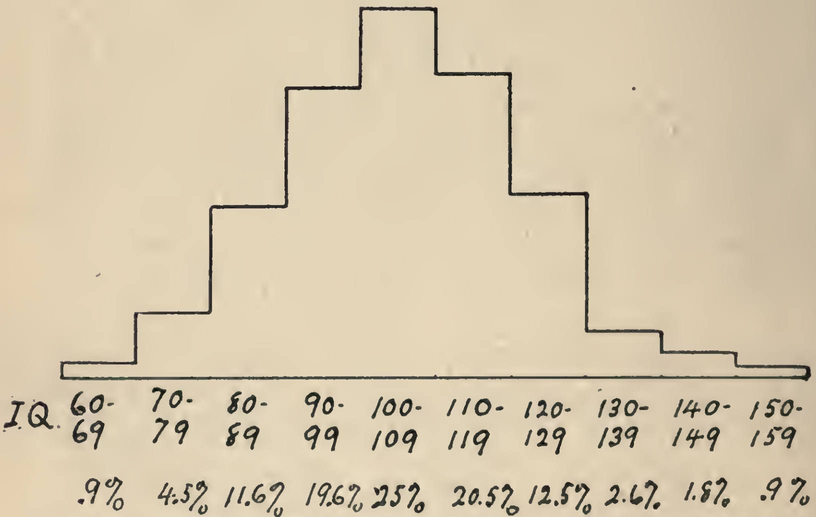
[1] The tests were all made by Miss Cuneo. Her preparation for the work included a theoretical course in mental measurement, one year of work in experimental psychology, and graduation from a kindergarten training course. The scoring was all checked over by me and the results were worked over and written up by us jointly.—Lewis M. Terman.

[2] These values are obtained from the smoothed curve.



GRAPH I. Ogive for Table I, showing distributions of intelligence quotients



GRAPH. II. Distribution of intelligence quotients of 112 kindergarten children, sexes taken together

In order to test the former hypothesis the children were divided into two age-groups, the first including those between 3 years 8 months and 4 years 11 months, the latter those between 5 years 0 months and 6 years 11 months. The median intelligence quotient for the younger group was 107.5, that for the older group 102.5. If we could be sure that selection had entered equally into the two groups this would indicate that for children of 4½ years the scale still yields a mental age which is approximately 7% (or 4 months) too high, but that this error largely disappears as we approach the mental age of 6 years. It is possible, however, that in a given kindergarten class the younger children are on the average somewhat better endowed than the older. At least this has been quite generally found to hold true in other school grades, and we can therefore not be certain to what extent the high median I Q is due to the selection of subjects and to what extent it

Table II. Showing Mental Ages Found in the Different Classes

A	B	C	D	E
3–10	4–1	3–4	3–4	3–4
4–1	4–1	4–2	4–0	3–10
4–3	4–3	4–6	4–2	4–6
4–3	4–4	4–6	4–2	4–10
4–7	4–7	4–8	4–6	5–0
4–7	4–8	4–8	4–6	5–2
4–8	4–9	4–10	4–8	5–2
4–9	5–5	4–10	4–8	5–8
4–9	5–6	5–0	4–10	5–10
4–11	5–9	5–2	4–10	5–10
4–11	5–10	5–2	5–2	6–0
5–0	5–2	5–4	5–3	6–2
5–1	6–3	5–4	5–8	6–4
5–3	6–6	5–6	6–0	6–6
5–3	6–6	5–6	6–2	6–8
5–4		5–7	6–3	6–8
5–6		5–9	6–6	6–10
5–8		5–10	6–6	7–3
5–8		6–0		
5–10		6–3		
5–11		6–4		
6–0		6–6		
6–0		6–6		
6–0		6–6		
6–0		6–9		
6–1		6–10		
6–2				
6–2				
6–4				
6–4				
6–6				
6–9				
6–10				
7–5				
7–7				

is due to imperfect standardization of the tests. In all probability both factors enter. Certainly the results do not warrant any extensive revision of the lower part of scale as it now stands. For practical purposes it is better for the scale to err, if at all, by being slightly too liberal.

It will be noted that only one subject tested below 70. This child (I Q 61) was recognized by the teacher as hopelessly feeble-minded. On the other hand, 6 tested as high as 130, 3 as high as 140, and one above 150.

Distribution of Mental Ages

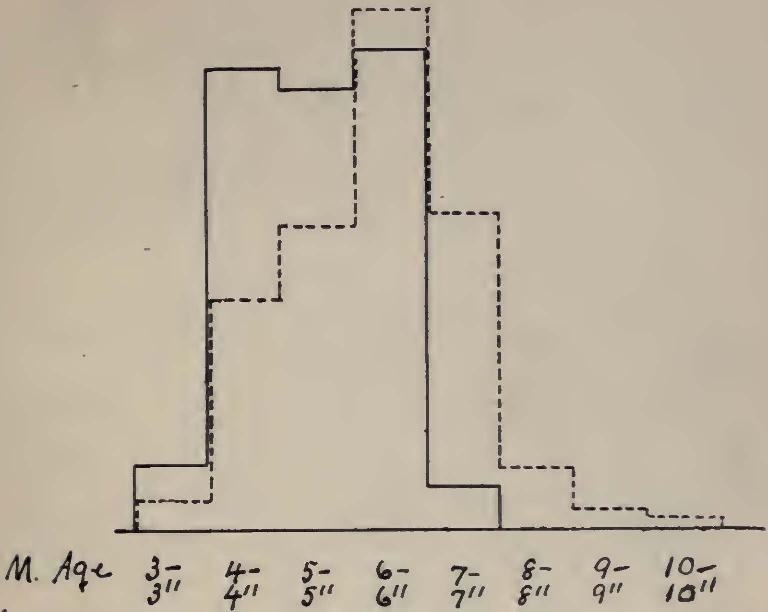
As already stated, the children of five classrooms were tested. The mental ages found are shown for the five classes separately in Table II.

The range in each class is found to be astonishingly great. In class A it is from 3-10 to 7-7; in B, from 4-1 to 6-6; in C, from 3-4 to 6-10; in D, from 3-4 to 6-6; and in E, from 3-4 to 7-3. Where there is so little homogeneity the task of fitting the work to the individual ability of the children must be very difficult if not impossible. To give the same school tasks to children ranging from 3 years to 7 years in intelligence cannot be justified on any grounds, and the practice of some kindergarten teachers in dividing the class into groups according to mental maturity is strongly to be commended.

Table III. Showing Per Cent of Kindergarten Children and First Grade Children at Each Mental Age

Mental Age		3 to 3–11	4 to 4–11	5 to 5–11	6 to 6–11	7 to 7–11	8 to 8–11	9 to 9–11	10 to 10–11
Per cent	Kindergarten	4.5	31.2	29.6	32.2	2.7			
	First grade	2.	15.4	20.4	35.	21.3	4	1.3	.67

Comparison of the mental ages of these 112 kindergarten children with the mental ages of 150 unselected first-grade children tested by Mr. Dickson may be made from Table III and Graph III. In fact, 17% of the kindergarten children equalled or exceeded the median mental age of those in the first grade, 66% equalled or exceeded the lower quartile for the first grade, and three equalled or exceeded the first-grade upper quartile. At least one-fourth of the kindergarten children have a mental maturity which would enable them to do satisfactory work in the first grade, while of Mr. Dickson's 149 who are in the first grade considerably more than one-third ought to be in the kindergarten.



GRAPH III. Showing how kindergarten children and first grade children overlap in mental age
Unbroken line = kindergarten children
Dotted line = first grade children

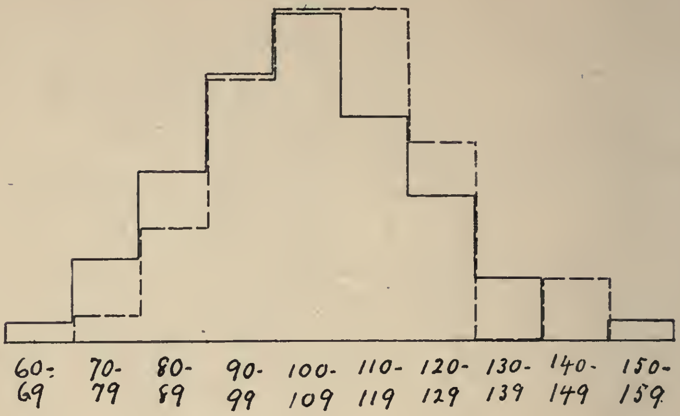
SEX DIFFERENCES

Comparison of the sexes showed that the girls have a higher median intelligence quotient but less variability than the boys. The facts are summarized in Table III and Graph IV.

TABLE IV. COMPARISON OF SEXES

	Median I. Q.	Lower quartile	Upper quartile	Q.
Boys	103	90	114	12
Girls	108	96.5	116.5	10

Although the brightest subject tested was a boy, it is seen that the girls have a significantly higher intelligence quotient. A part of this superiority may be accounted for by the fact that the median age of the girls is three months less than that of the boys. Sixty-four per cent of the girls were below the age of 5½ years, but only 47.7% of the boys. If, as seems probable, the scale grades somewhat more leniently at five years than at six, this would give a slight advantage to the girls in our comparison. When both boys and girls were



	60-69	70-79	80-89	90-99	100-109	110-119	120-129	130-139	140-149	150-159
Boys, %,	1.5	6.2	13.8	20	24.6	16.9	10.8	4.6	0	1.5
Girls, %.	0	2.1	8.5	19.5	25.5	25.5	14.9	0	4.3	0

Graph IV. Distribution of intelligence quotients of 65 boys and 47 girls in kindergarten classes.
Boys, unbroken line
Girls, dotted line

divided into two age groups, those below and those above five years, it was found that the median intelligence quotient for the younger group was higher for both sexes. For the boys, the median of the younger group was 104; that of the older group 102. For girls, the median of the younger group was 110; that of the older group 106. The girls are superior in each group, but the fact that there is a larger proportion of the total number of girls in the younger group than is the case for boys would give a slight advantage to the girls in the comparison of both age groups taken together. It is unlikely, however, that this alone would account for the difference between 103 (median for boys) and 108 (median for girls).

It is probable that, age for age, girls are slightly superior to boys in the kind of intellectual ability measured by the usual type of intelligence test. This conclusion is borne out by the results of many other investigations by the test method. It is also in harmony with sex comparisons based on teachers' ratings and school marks. In the present study, 56 of the boys and all the girls were rated for intelligence and 46 of the boys and 36 of the girls for quality of school work. The results are shown in Table V.

In something like a dozen separate studies we have found that for a given age or grade, girls invariably make a better

TABLE V. SEX DIFFERENCES IN INTELLIGENCE RATINGS AND SCHOOL WORK

	Very inferior	Inferior	Average	Superior	Very superior
Intelligence: Boys	1	9	35	8	3
Girls	0	3	29	10	5
School work: Boys	1	10	27	6	2
Girls	0	3	21	11	1

For teachers' ratings, therefore, we have:

	Inferior and very inferior	Average	Superior and very superior
Boys	17.9%	62.5%	19.8%
Girls	6,4%	61.7%	31.9%

For quality of school work:

	Inferior and very inferior	Average	Superior and very superior
Boys	23.9%	58.7%	17.4%
Girls	8.3%	58.3%	33.3%

showing than boys when rated by their teachers either for intelligence or quality of school work.

Comparison of the intelligence quotients of our boys and girls for variability shows that the girls are decidedly less variable. The boys range from 61 to 152, with a semi-interquartile range of 12. The girls range from 75 to 146, with a semi-interquartile range of 10. Application of Pearson's formula for determining the coefficient of variability $\left(C=\frac{Q}{M}\right)$ shows the girls 20.5% less variable than the boys. This supports the usual view as against that of Karl Pearson and Dr. L. S. Hollingsworth. It does not agree with our data on 1,000 unselected children, but is in harmony with two other Stanford University studies.

The sex differences found in the individual tests are given elsewhere in this paper. In general, such differences were not large.

CORRELATIONS OF TEST RESULTS WITH TEACHERS' RATINGS AND WITH SCHOOL MARKS

As already stated, 103 of our 112 children were rated by their teachers for intelligence.[3] We did not give the teachers any definition or criterion of intelligence, but simply asked them to classify the children on the basis of intelligence into five groups: "very inferior," "inferior," "average," "superior," and "very superior." The results of this classification were shown in the preceding section.

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[3] The names of 9 boys were omitted from the list by oversight.

The correlation of intelligence quotients with the teachers' estimates of intelligence (Pearson method) proved to be only .29 ± .06. This correlation is much lower than we are accustomed to find in the case of children attending classes above the kindergarten. Such correlations usually fall between .50 and .75. The low correlation found for kindergarten children may be partly accounted for by the nature of the kindergarten curriculum. The work is very general and for the most part very easy. Nothing is taught which offers the teacher a solid basis for estimating the pupil's intelligence.

Certain disagreements between ratings and intelligence quotients were plainly due to constant errors on the part of the teachers. There was frequent failure to take account of age differences. The 6-year-old is rated "superior" on an intelligence quotient about 10 to 20 points lower than a 4½-year-old must have to reach this class. The former gets in as easily with 100 I Q as the latter with 115 or 120.

The following cases illustrate this error: G. J., age 3-8, mental age 4-2, I Q 113, was rated as "inferior;" while M. L., also testing at 113, but aged 5-9, was rated "superior."

N. W., age 3-11, mental age 4-3, I Q 108, is rated "inferior;" J. M., age 6-11, mental age 6-6, I Q 94, is rated "superior."

M. S., age 4-1, mental age 5-4, I Q 130, is rated "inferior;" J. P., age 6-3, mental age 6-10, I Q 109, is rated "very superior."

This tendency to ignore age differences seems almost universal among teachers. There is probably no other cause of so much misunderstanding of pupils. Even when specifically told to take age into account teachers fail to do so to anything like an adequate extent. They have not grasped the significance of age norms.

The correlation between ratings and intelligence quotients was also lowered by the tendency of teachers to grade too many pupils "average."

It was possible to have 35 of the children rated by two teachers. The correlation found was .49 ± .085.

INTELLIGENCE QUOTIENTS AND SCHOOL WORK

The pupils in four classes, 82 in all, were rated for quality of school work as well as for intelligence. The same classification was used, very inferior, inferior, average, superior, and very superior. The correlation of school success (based on this classification) and intelligence quotient was .267 ± .07.

The factors which entered to produce a lower correlation between intelligence quotients and teachers' ratings are also operative here. Teachers base their estimate of a pupil's intelligence chiefly on ability to do the school tasks, disregarding age.

MENTAL AGE AND SCHOOL WORK

The correlation between mental age and school work is shown in Table VI. The correlation ($r = .43 \pm .05$) is moderately high, but lower than we have ordinarily found for children in the grades above the kindergarten. The corresponding figure for Dickson's first grade children was .725.

From Table VI it will be seen that not a single pupil of the 21 who tested below 4-9 in mental age was graded above "average" in school work, and that only one of the 33 testing above 5-9 was graded below "average."

TABLE VI. SHOWING CORRELATION BETWEEN MENTAL AGE AND QUALITY OF SCHOOL WORK

Mental age	Very Inferior	Inferior	Average	Superior	Very Superior
7–4 to 7–10			1		
6–10 to 7–3			1	1	1
6–4 to 6–9			9	3	
5–10 to 6–3		1	9	5	1
5–4 to 5–9		2	3	3	
4–10 to 5–3		2	13	4	
4–4 to 4–9		3	5		
3–10 to 4–3	1	4	5		
3–4 to 3–9		1	2		

$r = .43$

REPETITION OF TESTS

In order to secure data on the reliability of the intelligence scale for diagnostic purposes, 77 children were retested in three groups:

Group A, 25 pupils, interval of 2 days between tests.
Group B, 21 pupils, interval of 5-7 months between tests.
Group C, 31 pupils, interval of 20-24 months between tests.

The correlations were computed by the Spearman's footrule and the R values were changed to r values by a conversion table. The results were as follows:

Group	Interval	r correlation	P. E.
A	2 days	.95	.013
B	5-7 months	.942	.014
C	20-24 months	.852	.034

TABLE VII. SHOWING RESULTS OF 77 REPEATED TESTS

Group A, 2 days			Group B, 5–7 mos.			Group C, 2–24 mos.		
Age (Real) 1st Test	I. Q. Test 1	I. Q. Test 2	Age Test 1	I. Q. Test 1	I. Q. Test 2	Age Test 1	I. Q. Test 1	I. Q. Test 2
4–4	146	144	4–1	130	130	4–6	152	141
3–10	126	135	6–6	126	125	4–6	142	129
4–9	126	133	5–10	124	127	5–6	136	128
4–11	122	119	5–3	124	122	3–11	130	124
5–3	117	123	5–6	118	110	4–6	129	119
5–8	114	105	5–10	114	108	4–0	123	119
3–8	113	109	5–11	112	105	4–11	121	126
5–8	112	114	5–10	111	118	4–11	121	117
4–3	110	118	5–1	110	116	5–1	121	116
5–0	103	107	5–8	109	120	6–4	121	108
5–1	102	105	6–3	109	105	5–2	120	107
4–6	100	112	4–10	107	111	5–8	119	115
5–7	98	101	4–11	105	115	5–1	117	130
4–11	98	98	5–5	101	108	4–9	114	109
5–4	98	92	5–11	97	101	5–5	111	114
4–10	96	96	5–11	96	83	4–4	110	116
5–11	96	103	3–8	91	84	5–1	108	112
4–3	94	90	5–2	90	84	5–11	107	113
4–6	93	93	6–2	86	89	5–8	106	99
4–10	93	93	5–10	86	88	5–9	103	102
4–7	91	94	5–6	61	54	4–0	102	100
5–11	82	84				4–11	93	98
5–8	80	80				4–6	90	108
8–1	77	79				6–4	90	106
4–6	76	85				5–3	90	96
						5–6	85	100
						5–1	85	80
						4–10	80	108
						6–0	79	87
						5–2	75	98
						5–8	72	101

The correlations for Group A and Group B are seen to be very high, and for Group C somewhat lower. This is what we should expect, considering the greater interval by which the tests of Group C were separated. In Group A there was no change greater than 12 points, and only two above 9 points. In Group B there was no change greater than 13 points, and only three above 8 points. Group C gave three rather wide discrepancies, one of 23, one of 28, and one of 29 points. The last two of these three cases should probably be thrown out, as the mental age recorded for the inital test was based on the child's refusal to respond to most of the tests above the four year group. This was interpreted at the time as inability to respond. In all probability it was due to shyness, a disturbing factor which is sometimes difficult to overcome in testing children of kindergarten age.[4]

In general the agreement between the first and second tests is close enough to show that whatever abilities the scale tests are measured with a high degree of reliability. This is best seen in the low median amount of change. The median change and the lower and upper quartiles of the changes were as follows:

Group	Median change	Lower quartile of changes	Upper quartile of changes
A	3	2	7
B	6—	3	7
C	6+	5	13
A, B, C, together	6	3	8

When we consider the *direction* of the changes we find that the gains and losses are pretty evenly divided in each of the three groups.

	Retests showing gains	Retests showing loss	Central tendency of change
A	14	6	+2
B	9	11	—1
C	15	16	0

It appears, therefore, that in the case of young children memory of a previous test has no appreciable influence after the lapse of a few months, and that the effect is negligible even after an interval of only two days. This fact is important for the practical usefulness of the scale.

Do bright or dull children gain more in the repetition of a test? In each of the three groups, A, B, C, we have compared those above 100 I Q (first test) with those below 100, in regard to the amount of gain or loss.

In Group A, there are 12 children who earned an I Q of 100 or more in the initial test. Eight of these gained in the second test and four lost. Of the thirteen who tested below 100, six gained, two lost, and five neither gained nor lost. The central tendency for those above 100 represents a total average gain of 2.75 points; the central tendency for those below 100 is toward an average gain of 1.2 points.

In Group B, seven of the twelve children above 100 I Q. show a gain, six a loss, and one no change. Of the seven below 100, three show a gain and four a loss. The central tendency for those above 100 was toward an average gain of 1.4; for those below 100, an average loss of 2.

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[4] The initial tests given to Group C were Miss Cuneo's first experience in the use of the Binet scale. This may explain in part the lower correlation for Group C.

TABLE VIII. SHOWING PER CENT PASSING AT DIFFERENT AGES

	AGE			
III	4	5	6	7
Points, etc.	100	100	100	100
Key, etc.	100	100	97	100
Pictures	94	100	100	100
Sex	100	100	100	100
Name	94	94	97	100
6–7 syllables	94	100	100	100
3 digits	100	100	100	100
IV.				
Lines	72	94	100	100
Forms	Omitted			
4 pennies	67	83	89	100
Square	39	81	92	96
Comprehension	78	92	94	100
4 digits	94	94	92	100
12–13 syllables	78	88	92	100
V.				
Weights	17	52	73	100
Colors	33	65	73	96
Prettier	61	71	77	96
Definitions	61	75	80	100
Patience	17	60	73	87
Commands	50	73	80	96
Age	28	44	66	96
VI.				
Right-left	33	46	73	87
Omissions	28	35	61	87
13 pennies	11	44	59	100
Comprehension	44	62	81	96
4 coins	11	38	62	87
16–18 syllables	11	40	56	91
A. M., P. M.	28	44	50	78
VII.				
Fingers	0	8	31	70
Pictures	17	29	64	83
5 digits	17	46	64	91
Bow knot	6	4	28	65
Differences	0	17	34	57
Diamond	0	8	30	78
Days	Usually omitted			
3 digits bkd	Usually omitted			
VIII.				
Ball-field	11	6	36	57
20–0		2	14	39
Comprehension	11	15	30	70
Similarities	0	10	31	48
Definitions	0	0	8	39
Vocabulary	0	0	5	9
Six coins	0	2	2	26
Dictation	Omitted			

In Group C the situation was reversed. Only five of the twenty above 100 I Q gained, while nine of the ten below

100 gained. Above 100, the central tendency was toward an average loss of 3.6 points; below 100, toward an average gain of 14.3. As already stated, we believe that the excessive gains made by a small number of children of Group C who fell low in the initial test was due to failure in the first test to overcome timidity. The scores of Groups A and B offer a better comparison because they were made after much more experience in testing kindergarten children, and the data for these two groups indicate that bright children profit but little more from memory of a recent test than do dull children.

Data on the Individual Tests

Table VIII gives the per cent passing each test at the ages 4, 5, 6 and 7. Age 4 includes the range 3-6 to 4-5, age 5 the range 4-6 to 5-5, etc. The 77 repeated tests are counted as though they were tests of so many children in addition to the 112. The effect is that of 112 + 77, or 189 tests in all.

It will be seen from Table VIII that the several tests of any given year differ little in difficulty. In IV, the "comprehension" test is relatively easy for its group; in V, "patience" and "age" are relatively hard; in VI, "comprehension" is relatively easy; in VII, "bow knot," "differences" and "fingers" are relatively hard, while "pictures" and "five digits" are relatively easy; in VIII, vocabulary test is much too difficult.

Although the age-groups merge into one another in difficulty, the tests of no group seriously overlap those of an adjacent group.

Table IX shows the average per cent of passes, by age, for the tests of each group taken together.

Table IX. Average Per Cent of Passes for the Tests of Each Age Group Taken Together

	Average per cent passing at each age			
	4	5	6	7
Tests of III (combined).....	97%	99%	99.5%	100%
IV.....................	71	88.6	93.1	99
V.....................	38.1	63	74.5	95.7
VI.....................	23.7	44.1	63.1	89.4
VII.....................	6.6	18.6	41.8	74.
VIII.....................	3.1	5.	18.	41.

Sex differences in per cent passing were not numerous or large. The comparison was made separately for the two ages 4-7 to 5-6 and 5-7 to 6-6. There were not enough subjects above and below these ages to justify further comparison. The significant differences found are presented in Table X.

TABLE X. TESTS SHOWING SEX DIFFERENCES

Test	Per cent passing				
	Age 4–7 to 5–6		Age 5–7 to 6–6		Advantage
	Boys	Girls	Boys	Girls	
Colors..........	59	72	64	88	Girls
Prettier.........	56	88	72	84	"
Patience........	48	72	72	76	"
Right-left.......	33	60	74	72	"
Omissions.......	26	44	54	72	"
16–18 syllables...	67	80	74	88	"
A. M., P. M.....	56	32	56	40	Boys
5 digits.........	44	88	59	72	Girls
Bow knot.......	7	0	21	40	"

SUMMARY

1. The Stanford-Binet scale was given to 112 representative kindergarten children. Of these, 77 were tested twice.

2. The intelligence quotients ranged from 61 to 152, with the median at 105. The distribution closely approximated the normal. The difficultness of the Stanford Revision in this part of the scale was found to be not far from correct. If there is any error it is on the side of leniency.

3. The girls had a higher median intelligence quotient than the boys, but had a coefficient of variability 20 per cent less than that of the boys.

4. The mental ages ranged from less than 3½ to more than 7½ years. This gives rise to a serious problem in kindergarten instruction.

5. The correlations found between intelligence quotients and teachers' ratings, mental age and school marks, etc., were rather low. This was traced to certain constant errors to which teachers are subject and to the fact that the kindergarten work offers little basis for the estimation of intelligence.

6. Repeated tests gave a correlation of .94 after a half-year interval, and a correlation of .85 after a two-year interval.

7. Tests repeated within 48 hours showed little effect of practice. In repeated tests the bright profit slightly more than the dull.

8. The per cents passing each test at each age do not appear to warrant any radical changes in location or scoring of tests.

9. But few of the tests showed significant sex differences in per cents passing.

TEACHING CIVICS AS A SCIENCE IN THE JOLIET TOWNSHIP HIGH SCHOOL

By R. R. Smith

In the first place the reader must believe that civics is a science. If he is in the least doubt concerning the matter, he should consult an unabridged edition of Webster at once. He will find the subject classified as a science. He will furthermore find that science is knowledge duly organized and systematized. This definition certainly applies to civics which is supposed to place before the student an organized and systematized knowledge of government, a knowledge which has been gained from a study of history.

Now we come to this interesting syllogism which the reader is cordially invited to tear into fragments if he can; (1) science should be taught by the laboratory method; (2) civics is a science; (3) civics should be taught by the laboratory method.

There is not likely a teacher so antiquated that he will deny the truth of the major premise, although it took humanity almost 1900 years to stumble upon its truth by the inductive method of accidental observation, an expensive scientific method which has been too much in vogue for humanity's good. There is not likely a teacher who will deny the verity of Webster, or who will deny that the definition of science is applicable to civics; so our minor premise is safe.

The conclusion must follow. We have no choice in the matter.

Naturally, with such a syllogism in my mind, I have always believed in pupil self-government from the purely scientific basis which means that I have believed in it as a disciplinary measure as well.

When I came to Joliet Township High School four years ago I came not only with that syllogism in my mind, but with a number of successful experiments in smaller schools to my credit.

On analysis of the larger school conditions two things were apparent: (1) the school needed the stimulus which can come only when the governed have a share in the government; (2) the only difficulty in the way of organizing the larger school was getting a working unit.

However, popular government comes as a result of growth on the part of the body politic toward a desire for such a government. Believing that, I went to work systematically to build up a sentiment in favor of student government among the students themselves.

I talked student government among the students; I taught student government in my classes. I organized a club which died. I organized the senior class in order to bring the pressure of the majority of the class upon a minority who insisted upon using the high school column in the local paper for personalities of a very inane and deplorable sort—an organization which came near losing my job for me. Since this is a history of facts I owe it to the two boys in question to state that since then they have become very reputable newspaper men and are, as I have reason to think, my friends. I organized an English class into a club a report of which has already appeared. [See Bulletin of Illinois Association of Teachers of English of the Kewpy Club, Sept., 1917.]

The propaganda worked as propaganda will. The present senior class was not greatly affected. They are still inclined to scoff at the idea of self-government and to take it as their right to be knocked down—a state of mind which means that they rebel at being confronted by real problems to solve. But the present junior class would organize their room in a minute if allowed to, and one group, the 8th period one, is in a fair way of being allowed to. The sophomore class are ready for self-government as are the freshmen.

It is with a group of these sophomores that the paper has to deal. However, I must explain that shortly after coming here, I was given charge of one of the large home rooms which is used also for a study room. This is largely a sophomore room and here the sophomores study each of their twelve periods during the day.

At the close of last semester I asked that I be given permission to organize each of the twelve study periods for student government, but I was not permitted to do so. However, I was given charge of the twelfth period myself.

As I was doing an immense amount of war work outside of my regular school activities, and was manager of athletics in addition, I needed the period for myself. Consequently I immediately placed the proposition of government before the students. They responded in the affirmative.

I would like to state at this point that for success in a large school the machinery of the system must be simple. There is not time for the old New England town meeting type of procedure, as there is in a small school.

Our procedure was simplicity itself. Acting on the affirmative answer given, I drew up the following pledge which each student signed: "We the students seated in room 329 the 12th period, hereby pledge ourselves individually and through our officers to keep the room in order." Our next step was to elect four students to take charge of the room. Two students were to look after the discipline and two were to do the clerical work. The two sets were to be on duty on alternate weeks.

No new rules were made. Throughout the time I have been in charge I have preached "Think of the other fellow." I have insisted that students move quietly.

The principal rules in force in all study rooms are these: (1) pupils may leave the room only with duly signed pass blanks; (2) pupils who wish to speak must come to the desk for permission. These two rules reduce the confusion to a minimum.

The experiment has worked. The order has been as good as if a teacher were in the room. The morale has been much better. There have been no cases of discipline which the students in charge cannot handle.

Of the two students in charge, one is superior in every way. She is popular with the students. She is popular with the teachers—She makes high grades. The training in leadership has been of great value to her just as such training is always when it is real training.

The other student is bright enough. The fact that he is able to handle the room shows his ability. But he does not fit into the school machine so far. However, his grades have been no worse than last semester and his self-control is much better. An incident which happened not long ago is illustrative. Misunderstanding came up between him and a teacher. Because, through his self-government training, he had learned to check his emotions and make himself give his final decision as a result of reason, he was able to meet the teacher in question, talk over the situation, and come to an adjustment. Without such training he would have left the school in anger.

What the immediate future of pupil government here will be I do not know. But the American high school can do no greater service to the nation than to prepare its students to govern themselves sanely. Civics is a science hence should be taught by the laboratory method. In every high school in the United States there are from one to five big study halls that are by nature civics laboratories. To utilize these study halls as civics laboratories would not incur additional expense but would save many thousands of dollars in teachers' salaries. Is not failure to utilize this waste material an indictment against America's intelligence? Is it not really an invitation for the Kaiser to come and take up his government of the nation as an autocracy?

COMPARATIVE MENTALITY OF JEWS AND GENTILES

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Military records show that as a people the Jews have long been noted for their deficient vital capacity. The burden of evidence as presented by Smedley, DeBusk, and as corroborated by Goddard have shown that mental ability in school children (school standing) may be positively correlated with vital capacity.

A common impression seems to prevail at times that, as a people, the Jews have a greater mental ability than their less enterprising Gentile brethren. The "smartest" pupil of the public school classes was usually of Jewish descent, and it is undeniably true that some of the most brilliant scientific men and scholars of the 19th and 20th centuries have had a similar heritage. One phase of this supposed mental superiority has been exploded by Fishberg in his book on the Jews which points out that the greatest percentage of successful business men is found among the Gentiles, but that a greater percentage of business men in proportion to number of people in the race is found among the Jews.

The writer has been able to obtain records of the vital capacity of 112 Jewish boys and 54 Jewish girls of the high school age. These records show the following when compared with equal numbers of students of Gentile origin. The superiority of the latter in vital capacity as already indicated is manifest. When grouped by ages, and the average scholarship computed from their standing in the high school, a noticeable superiority in school standing as shown by the curriculum test was found to be with the Gentiles. This was observed to come most strongly at the earlier ages, slowly decreasing upwards, but at the age of 16, Jewish boys were slightly superior, which may be explained by the fact that large numbers of them leave school before this age and the survivors are thus selected individuals.

On the other hand, it seems that Jewish girls are mentally superior in this respect to Gentile girls at most ages compared, although the latter show higher scholarship at the age of 14. Evidence here is less easily taken due to the fact that even larger numbers of Jewish girls than boys seem to leave school past the first half of the teens. The same general results, however, are obtained when larger numbers of the more abundant Gentiles are compared.

Data obtained from tests conducted after the range of information plan on the biological subjects of the high school, when grouped as indicated previously, show that for 85 boys and 44 girls, each of both types of peoples, the error of marking is highest in Jewish boys and lowest in Jewish girls when compared with Gentiles. As the error of marking may be fairly considered as some indication of discriminatory power, the results presented in the preceding paragraph receive some confirmation. In this case, they are more independent of the marking of teachers, as the student grades himself. Any such factor as racial prejudice thus seems to be eliminated.

The Jews with whom these tests were conducted were the first generation of immigrants, and in the opinion of many are best representative. Of recent years, the matter of conservation in education has been receiving greater attention, and the tendency is to give instruction more fitted to the peculiar individual. Aside from the humorous aspects of the proposition, if the preceding observations be more fully substantiated, it seems that special attention could be justifiably given to students of Jewish extraction. The writer at times has also noted large percentages of defective hearing and vision among children of this particular social stratum. The evidence for mental superiority in Jewish girls may be said by some to indicate greater application on the part of the latter, but it is perhaps worthy of the remark, that, following the conservation principle as fully as possible, something should be done to encourage larger numbers of them to complete a secondary education.

The writer offers the above as tendencies observed, rather than conclusions taken. He is indebted to Miss L. Persow, a fellow worker, for aid in this connection.

BOOK NOTES

Manual of Physical Education for the Public Schools of the State of California. Part IV, Syllabus on Physical Training Activities with Methods of Management and Leadership. By CLARK W. HETHERINGTON. Sacramento, California State Printing Office, 1918. 191 p.

Clark W. Hetherington has the rare distinction among physical trainers of being an experienced educator, a man well trained in modern psychology, and at the same time an excellent athlete. His position as State Supervisor of Physical Education in California, too, is so novel and unique that all educators interested in these themes will look upon this instalment, not the first in the series but the first to be published of a larger scheme, with peculiar interest; nor will they be disappointed. It is impossible to give an adequate review of what is itself essentially a syllabus, but it seems, as far as it goes and considering the ground it covers, to be the best thing in its field.

Moral Education in School and Home. By J. O. ENGLEMAN. Boston, Benjamin H. Sanborn and Co., 1918. 314 p.

The author, a teacher of long experience, has not found in the literature upon the subject any attempt to analyze the possibilities for moral instruction and training in the every-day activities of the school. This he chiefly attempts to do in chapters entitled: The Educational Ideal, The Psychology of Moral Education, Moral Training Through the Example and Personality of the Teacher, through School Discipline, through Reading and Literature, History, Geography, Current Events, through Music, Art, Religion, through Manual Training, Physical Culture, Games and Athletics, through Vocational Direction, Thrift, Sex Instruction, Boy-Scouting, Motion Pictures, and through the Bible. The final chapter is on the Moral Lessons from the European War. Under this last topic he discusses the value of physical preparedness, tells us how social vice can be made unattractive, discusses the temperance movement, decorations for personal bravery, the promotion of unity, cooperation, sacrifice and service, and the new work of the schools. One of the best features of this new and interesting book is the references for further reading at the close of every chapter.

Psychic Tendencies of Today. By ALFRED W. MARTIN. New York, D. Appleton and Co., 1918. 161 p.

This volume discusses the various aspects of the new psychic movements in the light of evidence in hand, including Spiritualism, Psychic Research, Theosophy, Christian Science and New Thought. Part One deals with the modern interest in psychic phenomena, and Part Two with the effects of healing by mental treatment. This is all contrasted with hypnotism, the Emmanuel movement, and psychotherapy. Part Three is a study of Sir Oliver Lodge's "Raymond." All this leads the author to the conclusion that modern materialism, instead of denying immortality, shows the scientific warrant for a belief in it.

Hindu Achievements in Exact Science. By Benoy Kumar Sarkar. New York, Longmans, Green and Co., 1918. 82 p.

The main object of this little book is to furnish some chronological links and logical affinities between the scientific investigations of the Hindus and those of the Greeks, Chinese, and Saracens. The author, therefore, takes up sixteen topics, including six under Mathematics, to which he adds Kinetics, Astronomy and Physics, Metallurgy and Chemistry, Medicine, Anatomy and Physiology, and Embryology. He thinks that Hindu scientific investigation is no more mixed with metaphysics and superstitions than was the case in Europe. Nor was it confined to any one province of India, or class, or race. It is, in a word, the story of a growth and development in critical inquiry, sceptical attitude, and rationalism. Superstition has not had a deeper or more extensive hold on the Oriental than on the Occidental intellect.

Child Behavior. By Florence Mateer. Boston, Richard G. Badger, 1918. 239 p.

This is a work that is greatly needed and covers an important field. The writer began with years of experience in Vineland in applying Binet-Simon tests. She has also been employed in testing immigrants to this country and to Canada. She has broadened and extended her experience at Waverley, and is now a valuable assistant to Dr. Goddard in his new and interesting state position in Ohio. No one takes a broader view of mental tests, or has done more to connect them with the wider fields of psycho-analysis and psychotherapy than Dr. Mateer. This book should be widely read and studied.

Human Conduct. By Charles Clinton Peters. New York, The MacMillan Co., 1918. 430 p.

This is a textbook in general philosophy and applied psychology for students in high schools, academies, junior colleges, and for the general public. It is indeed a venture in a new field, and for psychologists it is significantly dedicated to Professor A. Duncan Yocum. Some of the more important chapters are entitled: How Our World Gets Enriched, How Misunderstandings Arise, How Our Senses Deceive Us, Apperception and Tact, Race Apperception, How We Solve Our Problems, Our Concepts and How We Make Them Clear, How We Learn the Cause of Things, The Pitfalls of Reasoning, Control of Conduct through Idea, The Factors in Personality, Effective Use of the Memory, Mental Imagery, Imagination and Its Culture, Attention, The Making and Breaking of Habits, Character and Will, The Strong Self, How Work May Be Saved from Drudgery, Loyalty, Choosing a Vocation, The Psychology of Periods of Discouragement, The Strong Man's Religion.

We cannot think this book adequately represents present-day psychology or would be very attractive to the young. There is a paucity of illustrations, which might easily have been very numerous and very stimulating. Secondly, there is almost nothing, save in the most incidental way, said of the feelings, emotions, and sentiments, which are the most dominant powers of the soul at the age this book addresses. Thirdly, there is practically nothing concerning the genetic aspects of psychology in animals, children, etc., and fourthly, it barely touches upon the very rich field of psychopathy, from which so much extremely interesting material can be drawn.

The author belongs to a school of thought one chief trait of which is to disregard these fields that bring psychology into such close relation to daily life. There are elements of behaviorism, too, which could have been used with excellent effect. The book should properly have been entitled "How a Certain Sect of Philosophic and Psychologic Thought Regard Certain Aspects of Human Conduct." The most glaring and fatal defect of the book, however, is that it barely mentions those domains of life in which the young people live, move, and have their being. The author seems to the writer of this review to have almost no conception of what adolescence is or means, to say nothing of what it needs. A work in this field might be not only more effective morally, but might also serve as a most stimulating and inviting introduction to further study in the human soul. This book has the disease so common in textbooks of affected finality, so that it would probably serve mainly to inoculate the mind of the high-school student against any further interest in the subject.

Healthful Schools. By MAY AYRES, JESSE F. WILLIAMS, and THOMAS D. WOOD. Boston, Houghton Mifflin Co., 1918. 284 p.

School hygiene comprises two fields, healthful physical environment and healthful school activities, each of course divided into numerous subsections. The authors claim that the question of school hygiene has never before been thought of as a whole by educators. We have chapters on School Site, Building, Room, Classroom Equipment, Lighting, Water, Toilet, Heating, Ventilation, Fire Protection, Cleanness, Medical Inspection, Physical Training, Recreation, Exceptional Children, and a final chapter on School Feeding. The work is done in textbook style, with questions and references at the end of every chapter.

Soul Crises. By JAMES WILLIAM ROBINSON. Boston, Richard G. Badger, 1918. 291 p.

This is a volume of sermons addressed to young men, which so proved themselves to those who heard them that the author is inclined to seek a larger audience.

Western Canada is a young man's country, but it is a place where the spiritual interests of the young are not neglected. The writer is especially impressed with the necessity of making homes and communities a worthy environment for the return of the soldiers from the war.

We are told that Christ can do great things, even for the morally upright. The possibilities of the average man are dwelt upon, the story of the man who came back is forcefully told. Interesting is the chapter on Christian Athletes. The chief crises, the author concludes, are moral, domestic, spiritual, and national. These twenty-one discourses cannot fail to be stimulating and profitable to young men.

Idealism of the French People. By LOUISE SEYMOUR HOUGHTON. Boston, Richard G. Badger, 1918. 80 p.

This book is handicapped by having no index of its eighteen chapters and no table of contents. We are given first a little historic sketch of France, which seems to show that in all her previous wars she has really been unusually idealistic. The same is true of her literature. Even her politics has been inspired by the same tendency. We are given comparisons between the French and other people in this respect, to the advantage of the former. A great many incidents are cited which illustrate the passionate devotion of the French people to ideals. The consummation of all this is seen in the worship of young heroes who have fallen, like Peguy, in such philosophers as Bergson, and in the ideals already forming as to the conduct of the people after the war.

The Rural School and the Community. A study of the application and methods of the social survey. By Howard T. Lewis. Boston, Richard G. Badger, 1918. 91 p.

The writer attempts to epitomize the vast body of discussion in recent years concerning the rural school, a topic hitherto too much neglected. To this volume he attempts to supply some sociological principles, and apparently has made good use not only of the excellent bibliography, which he prints, but of considerable practical experience. He discusses the function of a survey, the teacher's relation to it and to the curriculum, the problem of the adult, and the training of the teacher.

Meanings of Music. By Florence Traill. Boston, Richard G. Badger, 1918. 92 p.

These papers are based on talks to a Baltimore Woman's Club, but are very well worthy of a larger clientele. The topics are: Music in a Psychological Light, The Harmony of Theme and Form in Works of the Great Masters, The Musical Affinities of Italian Verse, The Purposes of Music, Grillparzer and Purcell, The Resources of the Music-lover.

A study of organization and method of the course of study in agriculture in secondary schools. By Theodore Hildreth Eaton. New York, Teachers College, 1917. 183 p.

This follows the usual rubrics of the very many Teachers College monographs. We are told how the data were collected, classification made, selection of schools, their description, aims, equipment, teachers, salaries, age of the pupils, subjects taught, methods, correlation, adjustment, etc.

The organization of instruction materials; with special relation to the elementary school curriculum. By J. W. Heckert. New York, Teachers College, 1917. 107 p.

This monograph covers the following topics: the observation of experience, its value, organization generally considered and as a factor in child life, present practices in curriculum-making, and applications of the principles studied, with illustrations.

Surveys in mental deviation in prisons, public schools, and orphanages in California. Sacramento, State Board of Charities and Corrections, 1918. 87 p.

Report of a survey of the University of Nevada. Bureau of Education, Bulletin, 1917, no. 19. Washington, Government Printing Office, 1917. 184 p.

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